Education Earnings and Income Distribution

DR. K. R. SHAH
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EDUCATION, EARNINGS AND INCOME DISTRIBUTION

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(An Inquiry Into Equity Issues Involved in the Government Financing of Higher Education in India—A Study of the M.S. University of Baroda)

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Preface

QUESTIONS like : 'Who benefits from Government expenditure? and Does it promote the objective of growth with distribution?' have been in the forefront in recent years. The concern of researchers with these questions cannot be overemphasised as government expenditure on social services, say, education and health, has been rapidly increasing. And the task of the researchers to examine such questions has been made simpler by the development of theoretical approaches.

The present study focuses on the structure of subsidy as an instrument to alter the distribution pattern of both education and earnings in the framework of human capital theory. The entire question of education, earnings and personal income distribution has been analysed with reference to the graduates of the Baroda University of the four bench-mark years. The comprehensiveness of the questionnaire has, in fact, enabled us to make our analysis as refined and sophisticated as possible.

Issues relating to equality of education opportunities are examined in Chapter 2. Chapter 3 discusses 'Determinants of Earnings', analysed by formulating the 'extended human capital earnings fuction.' Chapter 4 is concerned with (a) private costs of education, (b) earning profiles, (c) private returns to the investment in education, and (d) distribution of schooling and earnings. In Chapter 5, is presented the main findings of all the earlier chapters in an integrated fashion with a view to highlight the policy issues emanating from such studies.

The financial support for the present study has been provided by the Indian Council of Social Sciences Research (ICSSR), New Delhi. The then member-secretary of the ICSSR, the late Dr. J.P. Naik, was mainly instrumental in comissioning this study which otherwise would not have seen the light of day. My sincere thanks are due to him as well to the ICSSR.

Professors D.T. Lakdawala and V.N. Kothari were kind enough to go through the research proposal and offer their comments and suggestions towards its improvement before submitting it to the ICSSR. We take this opportunity to express

our heartfelt thanks to both of them.

Constant encouragement and continuous cooperation from the former Head and Dean of the Faculty of Commerce, Professor H.P. Chokshi, have in no uncertain terms played a major role in the smooth conduct of this study. Cooperation received from deans, principals and heads of various faculties, colleges and institutions of the Baroda University is duly acknowledged.

We have made extensive use of the computer both at the Indian Institute of Management, Ahmedabad and the Computer Centre, Baroda University. We have been fortunate enough to have had the expert services of Professor G.V.S.W. Murthy, Sardar Patel Institute of Economic and Social Research, Ahmedabad, for the computer work. We are thankful to him. We also express our thanks to Mr. G.G. Dholakia and Miss Jayshri R. Purandhare of the Computer Centre, Baroda University, for the cooperation extended by them at a time when we had become impatient to see through to completion the entire computer work.

Our thanks are also due to the staff of the Shrimati Hansa Mehta Library (Baroda University Library) who have always been eager to come to our rescue when we failed to lay our hands on the journals, books etc. so sorely needed.

We have been ably assisted by Sarvashri P.M. Shah and K.S. Vaja, Research Assistants associated with the project. They have smilingly borne the burnt of the field work and tabulation of data. The successful completion of the work owes as much to them as to the authors.

The non-academic staff of the research project, Shri J.S. Kelkar (typist-cum-clerk) and Shri B.P. Shah (accounts clerk), have also risen to the occasion and performed efficiently their respective task. They have always been cooperative.

The report was submitted to the ICSSR in June, 1981.

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Baroda
March, 1984

K.R. SHAH
S. SRIKANTIAH

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1

Introduction

The Problem

HUMAN capital in recent years has been viewed as important as, if not more than, physical capital. Its formation, growth and distribution seem to have far-reaching economic consequences. Of the various forms of human capital, formal education has been heavily stressed for both economic and non-economic reasons.[1] Formal education has grown stupendously. This growth owes much to the State as the share of public expenditure in the total expenditure on education has been steadily increasing. Education, being a 'public good', has been exceedingly subsidised by the State. The government has a direct stake in the expansion of education.

With the shift in emphasis from mere economic growth to growth with distribution, we have witnessed a revival of emphasis in the education field from growth of educational facilities to its distribution– region-wise, sex-wise and socio-economic group-wise. This simultaneous shift in emphasis is not without purpose. The human capital theory claims that education acts as an equaliser in society, promoting thereby the objective of growth with distribution. It is asserted that a great deal of market discrimination is primarily due to human capital discrimination. Human resources cannot be unequally treated if they are productive and have access to alternative jobs. The reduction in the discrimination in the development of human capital, making most forms of market discrimination such as wage, occupation and employment discrimination less effective, would alleviate income inequalities.[2] This claim of human capital theory demands rigorous scientific inquiry at the time when it is almost taken for granted that the beneficiaries of subsidised education are relatively better-off sections of society, promoting inequalities—both educational and economic. This allegation is

more pointed to the financing and subsidisation of higher education.

What attempts have been made to make the development of human capital less discriminatory in character ? How are human capital and earnings related ? What are the determinants of earnings ? Can human capital explain the structure and level of earnings ? Let us see how the human capital theory has tried to tackle these issues.

The Human Capital Theory

The human capital theory in its present form has evolved over the last two decades or more. However, this is not to be taken as a sheer absence of the knowledge of human capital and its role in economic growth of a country in the eighteenth and nineteenth centuries.[3]

Of the various forms of human capital, human capital formed through expenditure on education, especially formal education, has received wider attention for obvious reasons.

The human capital theory is based on the assumption that investment in human capital by raising productivity of persons enhances their life-time earnings. In a competitive labour market, an increase in the supply of workers, say, with more years of education, given other things, would lower their wages and increase the wages of those with less amount of schooling whose supply has fallen. The net result is (a) a larger output, (b) more equitable distribution of earnings, and (c) each getting according to merit.

The rapid secular expansion of education for the last many years as a result of heavy subsidy has not only affected the formation and growth of human capital but its distribution also. Stocks of human capital have definitely not increased uniformly. How has the labour market reacted to varying stocks of human capital ? Has the working of the labour market reduced the dispersion both in schooling and in earnings as expected by the 'wage competition model' ?[4]

It is an indisputable fact that education and earnings are positively related. Is it enough to explain the life-cycle of earnings ? The 'schooling' model assuming the completion of investment in human capital being coterminus with the completion of schooling, shows a weak correlation between schooling and earnings when earnings (in logs) are regressed on schooling. As a consequence we have witnessed the flood of interesting studies

constructing the 'extended human capital earnings function' employing a broader concept of human capital.[5] Alongwith schooling as a determinant of earnings, the other determinants of earning which are thought of and incorporated in the model are age, work experience, post-school investment, occupation, family background, IQ (ability) and pre-school investment or home investments (i.e., parental efforts towards the accumulation of the human capital stock of their children). They do influence earnings directly or indirectly and their incorporation in the model is "for the purpose of eliminating biases in the schooling coefficients when these variables are presumably improperly omitted".[6] Putting background institutional variables alongwith human capital variables in (the same) one earnings education is questioned and labelled as 'ad-hoc' analysis. If investment in human capital results not from random behaviour but from optimising behaviour, estimates of the 'independent' effects of each variable are biased if all are included in the earnings function.[7]

In the context of human capital and the distribution of earnings, it is observed that the latter is mainly affected by the dispersion in the amounts of human capital on the one hand and by the average magnitude and the dispersion in the rates of return, on the other. According to Becker's optimisation analysis,[8] the earnings function results from two simultaneous structural relations in the human capital market. These are (i) demand function (P_I) which relates individual investments to marginal rates of return and (ii) supply function (S^I) which relates the volume of funds that can be obtained for human capital investment to major marginal costs. By altering these functions through an institutional factor called 'subsidy', the two determinants of distribution of earnings, namely, rates of return and the distribution of schooling can be so changed that greater equality in earnings is realised.

Becker and Chiswick in their model show the parameters to be changed in terms of the correlation conditions between two demand and supply functions. The marginal returns reflect ability, the marginal costs determine the 'flow of funds'. A high marginal rate of return and a low marginal cost (alternatively, a low marginal rate of return and a high marginal cost) constitute positive correlation conditions. By subsidisation, the supply functions can be influenced by providing a greater flow of funds for those with a low marginal rate of return. This will

be negative correlation condition. This will reduce the dispersion in investments, in schooling and in rates of return (see Fig. 1).

This has also given place to the concept of 'overtaking', i.e., At what stage does the effect of schooling on earnings become less significant and that of others (especially human capital variables) become more significant ? or What is the correlation between the stock of human capital at any stage of life-cycle and the volume of subsequent investments ? What about the earnings inequality at the overtaking stage ? How far do the two human capital variables together—schooling and post-school investment—explain aggregate inequality ?

It is further observed that "aside from the change in the shape of schooling distribution, the continuous growth of education contributes to a reduced inequality of earnings".[9] The continuous growth of education causes upward trends in education in this sense that "the level of education is higher in young than in old age-groups off-setting in part the age variation in earnings caused by the growth of experience with age. It is said that "the stronger the upward trend in schooling the smaller the aggregate inequality".[10] The crux of the theory boils down to: How much is the inequality in earnings explained by the investment in human capital? Thus, the human capital theory postulates a positive relation between accumulated investments in human capital and earnings. Further, if the two are related strongly, this should serve primarily as a tool for analysing the structure of earnings and for understanding existing inequalities in labour incomes".[11]

The empirical conclusions based on the studies of this nature are that (a) "The human capital variables have proved to be quite robust, retaining significant effects on earnings even when measures of ability and background are introduced into earnings equations while the direct effect of ability and background variables on earnings has proved to be small relative to the effect of education, the effect of these variables on education itself seems to be substantial". (b) "For the most part, earnings do not directly result from pure rents on family characteristics . . .". The most consistent finding in the studies reviewed is that the variance in schooling accounts for a significant share of the explained variance in income.[12]

It is the 'screening' hypothesis, denouncing the productivity functions of schooling in affecting earnings, that has recently

become more debatable. The job competition model is viewed with especial importance in relation to government expenditure on education and training policies. "In a labour market based on job competition, an individual's income is determined by (a) his relative position in the labour queue and (b) the distribution of job opportunities in the economy. Wages are based on the characteristics of the job, and workers are distributed across job opportunities in the labour queue. The most preferred workers get the best (highest income) jobs . . . Labour skills do not exist in the labour market, on the contrary most actual job skills are acquired informally through on-the-job training after workers find an entry job and a position on the associated promotional ladder . . . . It is the demand for the job skills which create the supply of job skills.

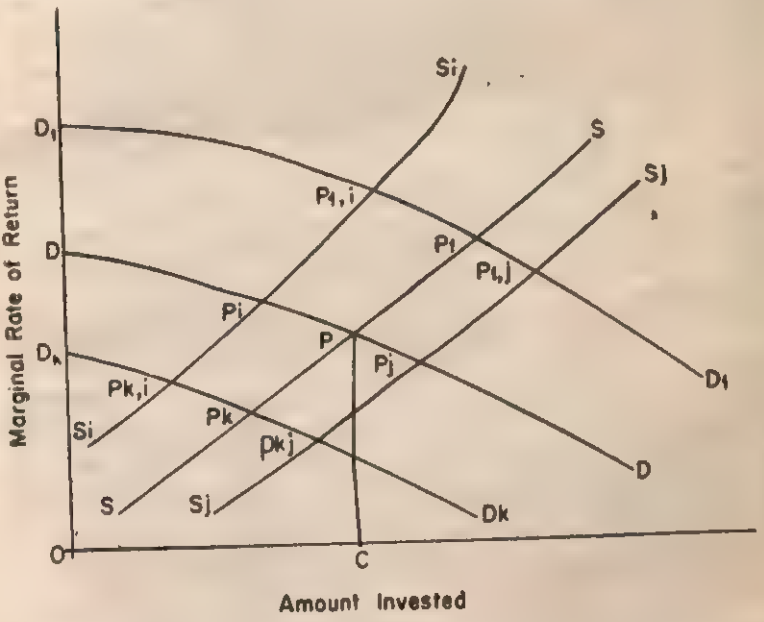

FIG. I

Supply and Demand for Investment in Human Capital

"In a labour market governed by job competition employers rank workers on a continuum from the best potential worker (trainee) to the worst potential worker (trainee) on the basis of the estimated potential training cost.

"Finally, to the extent, that education and formal training are an important background characteristic used for screening individuals, alterations in the distribution of education can have an important impact on the shape of the labour queue . . . . This does not necessarily mean that it can change the actual distribution of income".[13] On the other hand, Taubman and Wales have derived "a means to test the extent to which education increases earnings because of increases in productivity and because of screening . . . . Perhaps one-half of the educational earnings differences are due to increased productivity by education, and the remainder is due to signalling or, in their terminology, screening."[14]

We may sum up the foregoing arguments as follows: In a given economic system, a given labour force and market structure result in the distribution of income which is inequitous because of market imperfections. Human capital, especially through investment in education, results in reordering in the economic system contributing to growth and achieving a more equitable distribution. The state intervenes in the formation of human capital to correct the inequalities of opportunities such that egalitarian goals are achieved. More specifically the financing and subsidisation of education are the means of intervention. However, in India there is a near consensus among economists that the present system of financing education is inequitable. This in our view should not go unchallenged.

The view that the present system of financing has added to inequality rather than reducing it emanates not because the observers' understanding is wrong but their methods are inadequate. As happens often in inquiries, the trees are lost for the wood. The over-all subsidy—which is but one part and not necessarily the main—should be examined along with the 'specific' subsidies through which the State intervenes. Therefore, in our work, we intend testing the following hypotheses which are ordered chapterwise.

Hypotheses

1. General public subsidy, i.e., charging price below cost, is less egalitarian under the prevailing economic, social and political system and initial glaring inequalities.
2. Specific public subsidy is supposed to make the human

capital market more perfect, thereby removing the supply constraints for the availability of funds and thereby attains the objective of equality of educational opportunities interpreted as 'equality of investments' rather than 'equal investment'. This should narrow 'educational distance' between generations as wells as between socio-economic groups.

3. Private demand for education is characterised by 'optimising' behaviour or maximising economic welfare.
4. Human capital and earnings are positively related.
5. The effect of 'family background' on education is direct and substantial whereas that on earnings is indirect and small relative to the effect of education on earnings. If education has a depressing effect on earnings, the family background which affects education positively may reinforce the aforesaid depressing effect on earnings. The effect of 'family background' on earnings *vis-a-vis* 'education' could be direct and large because of imperfections of labour market and monopoly occupations (professions) and large scale self-employment.
6. How are current earnings influenced by starting earnings? Since most educated persons wait for a more remunerative job which in turn influences later earnings, current (or present) earnings are positively related to starting earnings and thus interdependent. If this were so, starting earnings would be positively related to education.
7. Present earnings are presumed to be positively related to occupational rank, showing indirectly the relation between education and earnings.
8. Earnings and nature of employment are positively related, i.e., whether a person is an employee in the public or private sector or self-employed.
9. Variations in earnings are more explained by 'human capital' broadly defined than by mere 'education'.
10. Human capital depreciates negatively in the beginning, zero at the peak and then positively in the end. And marginal returns rise in the beginning, are highest at the peak and then diminish.
11. More equal distribution of income moves sympathetically with more equal distribution of schooling.

12. Mere continuous expansion of education, altering the distribution of schooling of the persons and the age-structure of the labour force in favour of younger persons, is capable of altering earnings distribution.
13. Between the employees and the self-employed, equal education and unequal income distribution may co-exist; in the long-run, however, the share of the employees in the total employment will increase at the expense of the self-employed, thus reducing the inequalities.

Data and their Limitations

The necessary data have been collected through a survey from a 5 per cent randomly selected graduates of the four benchmark years—1961, 1965, 1970 and 1975—of the M.S. University of Baroda. The survey was conducted during the later half of 1979. Graduates were asked to supply the following information :

(a) Educational attainment of respondents themselves and their families;
(b) Employment status of respondents and their families;
(c) Earnings—both starting and current (1979)—of respondents;
(d) Earnings of parents at four different stages of their working life: (i) starting earnings (i.e., in the first job); (ii) earnings at the time when their children were students; (Iii) earnings in 1961; and (iv) current earnings (1979) of the parents still working and the current earnings of respondents' brothers and sisters;
(e) Post-school investment of respondents only; and
(f) Quality of education of respondents only (see questionnaire).

Of the 523 sample graduates[15] spread throughout the width and breadth of India, we could collect information from 294 graduates accounting for 56 per cent response. From this number, we have excluded those who have settled abroad and females not working. The data mainly relate to male earners classified as respondents, respondents' parents and respondents' brothers and sisters.

Respondents are classified into 'B.C.', 'E.B.C.', 'Aided' and

'Unaided': 'Backward classes', 'Economically backward classes', 'Aided students' and 'Unaided students'—a classification which is officially recognised but, more importantly, suits our analysis. The impact of subsidised higher education on relevant socio-economic groups can easily be evaluated. We have chosen the university in a State (Gujarat) where the proportion of scheduled caste/scheduled tribe population to total population is as high as that obtained for the country as a whole.

Respondents vary in age, experience, education, post-school investment and even in earnings. In contrast, their parents are older, with less education on average. Respondents' brothers and sisters fall between these two.

This variation in the size of the stock of human capital, as revealed by our data, is certainly an asset to us for the analysis of the problem of human capital and distribution of earnings. The intricacy of age, education, experience and earnings can be brought to light. The effect of continuous expansion of education over a fairly long period on distribution of schooling and earnings can be examined with the type of data described above.

For the analysis of the problem of the distribution of individual earnings in terms of human capital theory, the data employed refer to the labour force of the economy as a whole. The educational attainment of the labour force and its earnings and other relevant socio-economic characteristics are considered either within region or between regions. Unlike this, our sample constitutes graduates of one university. The educational attainment of earners, their earnings and other socio-economic characteristics may not necessarily correspond to the labour force of the Indian economy. This is an important limitation. However, looking to the problem to which we have addressed ourselves, the questionnaire and the information gathered seem quite comprehensive, particularly when there is a total dearth of information. Moreover, they are spread throughout the country and elsewhere, similarly not necessarily belonging to a given unique background—caste-wise, religion-wise, income-wise or even region-wise. This argument can be justified by analysing a typical year's enrolment and considering the entry of students from other parts of the country (outside Gujarat).

Graduates are chosen as our respondents simply because the major purpose of our study, as clarified earlier, is to examine

the impact of subsidised higher education on the inter-temporal equity in education and economic opportunities. This level of education is chosen because it has expanded rapidly in relation to other levels since Independence. It is the costliest level of education in terms of draft on a nation's resources and is heavily subsidised. Moreover, the link between earnings and education is more direct and clear at higher levels of education than at lower levels in the sense that there is a large degree of correspondence between education, earnings and occupations as revealed by our data (see Table 1.1).

The rapid growth of higher education has created a situation of 'education inflation' in India, meaning thereby an over-supply of highly educated persons. How has the labour market reacted to this kind of excess supply ?

Furthermore, the expansion of education in general and higher education in particular has certainly altered the characteristics of the labour force as is evident from the doubling of the share of urban workers with a university degree and above between 1961 and 1971 census. Similarly, workers in the age-group 15-34 accounted for about two-thirds of the workers in 1971 which was slightly above one-half according to 1961 census (see Tables 1.2 and 1.3). The reliability and usefulness of our data lie in the fact that the two trends observed for the urban labour force get reflected to some extent in our data (Table 1.4). Tables 1.5, 1.6 and 1.7 bring out the representativeness of our sample.

The financing of higher education particularly has been attacked since the pattern of financing, it is claimed, is said to have promoted inequalities. The impact of subsidising a particular level of education cannot be different from that of the education sector as a whole as the structure of subsidy (or the pattern of financing) evolved does not significantly differ from one level of education to another. If the financing of higher education were inequitous, the financing of lower levels could as well be inequitous. The pertinent question is, Which of the two types of broadly classified subsidies, namely, 'general' (over-all) public subsidy and 'specific' public subsidy, has furthered inequalities and which has checked that tendency. However, it cannot be surmised from the above that the impact of human capital formed by subsidised education on the distribution of earnings is the same when the dispersion in human capital (especially in years of schooling) is

less when the population is homogeneous (graduates of the university) and it is high when the population is heterogeneous (persons with varying amounts of schooling). How are education and earnings related when the population selected is 'homogeneous' in their schooling? Does dispersion in schooling (i.e., from 15 to 22 years of education) explain dispersion in earnings as much as it is explained by the much wider dispersion in schooling? How about the role of human capital variables and family background variables in explaining earnings dispersion when the population is homogeneous and heterogeneous? Though population is homogeneous in terms of years of schooling, it can differ in age and experience structure, as in our case. What about the dispersion of earnings under such a situation? Is it correct to hold a particular level of education responsible for existing inequalities consequent upon its subsidisation? How has the continuous expansion of education influenced the distribution of schooling and earnings? Does this distribution conform to the wage competition model? Such questions have so far not been raised because the system of financing education and consequently generated equalities/inequalities has not been viewed in an integrated fashion. As late as 1972 estimates of the returns from a human capital earnings function were based on the number of years of schooling as an index of investment costs because of the lack of data on other differences in investmten costs.

Our cost calculations are not only net of subsidies but based on a cross-section of private costs (investments) by income groups based on a field survey.

With the data we have, these questions can be answered.

Our data are largely cross-section in character but we have taken two terminal references for graduates and four bench-mark period earnings data for parents to provide correctives.

Methodology (Statistical Procedure)

Distribution and utilisation of educational facilities by various socio-economic groups now figure more importantly than mere growth of such facilities in policies of many developing countries of the world. With this view in mind, by employing the technique of trend and ratio analysis, we have examined, on the basis of time-series data covering the period from 1960 to 1980, the growth of enrolment of students in the M.S. University of Baroda in terms

of the earlier classified categories of students and the issue of inter-temporal equity in educational opportunities. The observed trend in enrolment, when viewed in relation to incremental costs or returns, is expected to throw light on the behaviour of individuals investing in their schooling which is assumed to be 'optimising' in human capital theory in the context of the distribution of earnings. This is in tune with the theoretical reasoning that better distribution of schooling facilities consequently affects and improves the distribution of personal earnings.

When the objective is to analyse the personal distribution of income in terms of the human capital theory, 'the basic conceptual and observational unit of human capital is the lifetime earnings stream of the individual earnings'. Earnings are viewed as return on the human capital stock accumulated by the individual. The size of the capital stock changes over its life-cycle, reflecting corresponding changes in earnings.

The age profiles in earnings show that initially, during the first decade of working life, rate of change of earnings is rapid. (During the first five years of working life it does not seem to be as rapid as the next decade of working life). During the next decade the rate of growth of earnings slows down, levels off in the following decade and then decelerates in the last 5 or 10 years of working life. This behaviour of age-earning profiles indicates the posit've rate of investment in human capital (or negative rate of depreciation) in the early years of one's life as the marginal cost of investment is low as pay-off period is longer. As one attains middle age, the rate of investment becomes zero (i.e., zero rate of depreciation) and there is a consequent levelling of rate of change of earnings. As one approaches the retirement age, the rate of investment turns out to be negative (a positive rate of depreciation and also because of obsolescence of human capital) and there is deceleration of the rate of growth of earnings. This holds when the average earnings of 'homogeneous' cohorts are studied over time. Individual earning profiles differ, even within such groups, in height (level), rate of growth (slope), and the rate of change of growth (curvature). These levels, slopes and curvatures are the parameters of the individual earnings, the analysis of which tells us about the size distribution of earnings of the labour force. This explains the earnings profile in terms of the depreciation rate alone. What about experience? It is argued that if age and experience

are statistically separable, the earnings curve is found to be a function of experience rather than of age. With experience as an explicit variable, the age-schooling interaction effects on earnings vanish. It is also claimed that earnings profiles differ by occupation, sex, and other characteristics in systematic ways not attributable to the ageing phenomenon.

In order to gauge correctly the significance of various determinants of earnings, we have followed the econometric technique of step-wise regression. On this basis, we have computed life-time earnings of respondents (all graduates), their brothers and sisters and parents to show whether life-time earnings so estimated tally with the theoretical earnings profiles depicted earlier. The computers used for running regressions are IBM-360 and PD-1170 (IIM). In the following chapter, the life-time earnings will be used alongwith costs to estimate returns from investment in education. For the size distribution of income, we have first computed the share of lowest 10 per cent and that of subsequent 10 per cent in schooling and earnings for three broad groups of persons—respondents, their brothers and sisters and their parents. These have helped us in plotting Lorenz curves and enabled us to estimate the intra- and inter-temporal distribution of personal income.

Then, the four widely known and commonly used measures for measuring earnings inequality, *viz.*, Gini coefficient, Skewness and Dispersion, Coefficient of Variation and variance of log of earnings and education, are employed for the said purpose. Various hypotheses spelt out previously are studied in terms of these four inequality measures. The analysis is mainly based on primary data collected through a field survey and partly on secondary data also.

Concepts Used

1. Earnings equal total of basic salary, dearness allowance, bonus, city compensatory allowance and non-practising allowance wherever applicable. Earnings always are before tax.
2. Education is measured in a number of years of formal schooling. Failures are ignored.
3. Experience in case of respondents is the present age minus the age at first job. (In the case of parents, years of education and number of years before education are sub-

tracted from the present age).

4. Post-school investment includes additional formal schooling acquired by respondents while on-the-job.
5. Quality of education (a proxy for IQ-ability) refers to the class/grade obtained at the matriculation examination.
6. Nature of employment is an index of education-earning employment sector complex.
7. Family background consists of three elements—parents' number of years of schooling, earnings and occupational ranking, as is done above.

The corresponding tables showing the computational analysis are given at the end of this chapter (see Tables 1.8 and 1.9).

Summary of the Main Findings

The problem of the distribution of human capital (formed through subsidised education) and earnings is studied by employing the Human Capital Approach.

The two conclusions succinctly brought out by our analysis are : (i) persons with low mean education, older age and preponderantly self-employed show greater education and income inequalities; and (ii) persons with higher mean education, younger age and declining proportions of self-employed show less skewed distribution of education and income.

The tendency towards better size distribution of income is woefully slow and is not consistent either. However, that financing of education has not furthered inequalities, if not altered them, is a point to reckon with.

The bridging of educational distance inter-temporally, the creation of efficient human capital stock and better distribution of income, are clear social benefits with far-reaching effects on the future course of the economy.

Schooling inequality is clearly amenable to fiscal measures even in the short-run. The earnings inequality, on the contrary, is essentially a long-run problem.

That *general* subsidy at any level of education is non-egalitarian seems plausible. But the same cannot be said of *specific* subsidy which has appeared as an antidote. By emphasising the specific subsidies further and by making education service a little more competitive, it is possible to alter the currently dubious role of subsidy

by affirming its positive effect.

The emerging human capital stock is characterised by younger persons with more education and is expected to have a multiplier on future distribution pattern and earnings. The narrowing of effect educational distance among different categories and between generations and the emerging human capital stock are as much social gains as private.

With regard to the over-all subsidy, the stratifier effect is much more pronounced than the equaliser effect. The specific subsidy, in contrast, does have the equaliser effect in the sense of higher per capita subsidy going to beneficiaries with low per capita income. It has reduced the educational distance between various classes and generations revealed by relative enrolment ratio and relative participation rate (which have improved for B.C. and E.B.C. categories).

The structure of subsidy comprises general/overall subsidy and specific subsidy. The former implies that the price charged for education service is below cost and not competitive. It is notional and enjoyed by all. The specific subsidy, on the other hand, is meant for hitherto backward sections of society and aims at the qualitative-vertical expansion and distribution of educational facilities.

The two determinants of the distribution of earnings are the distribution of schooling and the average magnitude of the rates of return. The institutional factor called 'subsidy' is supposed to affect the dispersion both in schooling and earnings in favour of persons with unfavourable supply and demand conditions.

Education and earnings are positively related only after a critical minimum education which is 10 and more than 10 years of schooling. The extended human capital earnings function places the human capital varaibles in a clear perspective. Analysis of costs, rates of return and efficiency of investment confirm the the predictions of human capital theory. Rates of growth of earnings are higher for persons with more schooling. The earnings are subject to diminishing marginal returns and the efficiency of the investment in education is found to be increasing. The levels of education and earnings are inversely related.

Our analysis is in conformity with the wage competition model according to which diminished inequality of schooling is associated with diminished inequality of income.

TABLE 1.1

Average Earnings by Educational Attainment

(*Rs.*)

Level of Education	*Parents*	*Brothers and Sisters*	*Respondents*	*All*
1	*2*	*3*	*4*	*5*
Illiterate	6000	3600	—	4720
	(4)	(1)	(—)	(5)
1 to 4	10141	—	—	10141
	(15)	(—)	(—)	(15)
5 to 7	8203	8288	—	8223
	(25)	(8)	(—)	(33)
8 to 10	10771	5670	—	8645
	(14)	(10)	(—)	(24)
11	13059	6750	—	8945
	(23)	(43)	(—)	(66)
12 to 14	16954	7551	—	10237
	(12)	(30)	(—)	(42)
15 and above	18744	11788	12702	12811
	(29)	(142)	(244)	(415)
All	12354	9903	12702	11540
	(122)	(234)	(244)	(600)

Note : Figures in parentheses are the number of observations by level of education.

TABLE 1.2

Workers (urban areas) : India and Gujarat

(Percentages)

Educational Level	*India*		*Gujarat*	
	1961	*1971*	*1961*	*1971*
1	*2*		*3*	
Illiterate	42.17	25.10	37.70	29.78
Literate	26.90	11.21	15.86	19.82
Primary or Junior Basic	17.65	30.99	37.19	26.60
Matriculation or Higher Secondary	9.36	16.43	6.67	18.38
Technical Diploma (not equal to Degree)	0.28	0.12	0.25	0.06
Non-technical Diploma (not equal to Degree)	0.47	0.63	0.03	0.49
University Degree or Post-graduate Degree (other than technical Degree)	2.41	4.32	1.38	3.69
Technical Degree or Diploma (equal to Degree or post-graduate Degree)	0.76	1.19	0.88	1.16
Total	100.00	100.00	100.00	100.00

Source: Census 1961 and 1971, Vol. I, Part II-B(1) General Economic Tables. And Part A-B-III Industrial classification of workers and non-workers by educational levels in urban areas only (00.260-61).

TABLE 1.3

Distribution of Workers by Educational Level and Age Groups

(Percentages)

Age-Group in Years	*India*		*Gujarat*	
	1961	*1971*	*1961*	*1971*
1	*2*	*3*	*4*	*5*
0—14	3.02	2.42	2.08	2.04
15—19	—	7.02	—	8.18
20—24	—	13.48	—	15.00
25—29	—	15.14	—	14.86
30—39	—	26.62	—	26.23
15—34	52.27	62.20	53.34	64.27
40—49	—	19.55	—	18.73
50—59	—	10.42	—	10.31
35—59	39.71	29.97	40.37	29.04
60+	4.98	5.34	4.22	4.68
Age not stated	2.64	0.01	—	—
Total	100.00	100.00	100.00	100.00

Source: Census 1961 and 1971, Vol. I, Part II-B(i) General Economic Tables.
B-1 workers and non-workers classified by sex and broad age groups. (pp. 86-87).

TABLE 1.4

Graduates by Level of Education

(Percentages)

Sr. No.	*Level of Education*	*Census 1971*	*M.S. University*		*Our Sample (N=523)*	*Actual (Respondents contacted) (N=294)*
			All	*Only 1970*		
1		*2*	*3*	*4*	*5*	*6*
1.	Ph.D.	0.78	1.22	1.56	1.72	2.38
2.	Post-graduate Diploma	17.90	14.74	15.49	12.43	11.23
3.	Other Post-graduate	1.93	—	—	—	—
4.	Graduates	69.18	79.50	80.21	82.41	82.31
5.	Graduate equivalent	0.76	—	—	—	—
6.	Diploma	7.85	4.54	2.74	3.44	4.08
7.	Certificate	1.55	—	—	—	—
8.	Unspecified	0.05	—	—	—	—
	Total	100.00	100.00	100.00	100.00	100.00

Note: Col. 3—Average of graduates of four bench-mark years (1961, 1965, 1970 and 1975) of the Baroda University.

TABLE 1.5

Classification of Total Number of Graduates by type of Education

	Ph.D.			*Post-graduates*			*Graduates*			*Diploma*			*Total*		
	M	*S*	*Total*	*M*	*S*	*Total*	*M*	*S*	*Total*	*M*	*S*	*Total*	*M*	*S*	*Total*
1		*2*			*3*			*4*			*5*			*6*	
1961	16	4	20	177	18	195	1001	155	1156	9	4	13	1203	181	1384
1965	12	6	18	291	26	317	1487	295	1782	156	33	189	1946	360	2306
1970	30	15	45	385	62	447	2004	311	2315	73	6	79	2492	394	2886
1975	30	15	45	535	47	582	2726	335	3061	118	49	167	3409	446	3855
Total	88	40	128 (1.22)	1388	153	1541 (14.74)	7211	1096	8314 (79.5)	356	92	475 (4.54)	9077	1381	10458 (100.00)
1961	—	3	3	11	1	12	55	6	61	2	—	2	Ph.D.		9
1965	—	—	—	13	—	13	69	13	82	4	—	4	Post-graduate		65
1970	—	3	3	13	4	17	112	13	125	6	1	7	Graduate		431
1975	2	1	3	22	1	23	144	19	163	3	2	5	Diploma		18
Total	2	7	9 (1.72)	59	6	65 (12.43)	380	51	431 (82.41)	15	3	18 (3.44)			523 (100.00)

TABLE 1.5 (Contd)

	Ph.D.			*Post-Graduate*			*Graduates*			*Diploma*			*Total*		
	M	*S*	*Total*	*M*	*S*	*Total*	*M*	*S*	*Total*	*M*	*S*	*Total*	*M*	*S*	*Total*
1		*2*			*3*			*4*			*5*			*6*	
1961	2	3	5	3	2	5	17	6	23	—	—	—	Ph.D.	7	(2.38)
1965	—	—	—	4	1	5	22	8	30	2	—	2	P.G.	33	(11.22)
1970	—	—	—	7	1	8	40	2	62	4	1	5	Graduate	242	(82.31)
1975	1	1	2	6	9	15	87	40	127	2	1	3	Diploma	12	(4.08)
Total	3	4	7	20	13	33	166	76	242	8	2	10		294	(100.00)

Note: M—March/April Examination.
S—October/November Examination.

1. Figures in parentheses are percentages to total (Col. 6)
2. N=523 in Col. 6 relates to our sample size.
3. N=294 in Col. 6 relates to the number of graduates responded to our inquiry.

TABLE 1.6

Economic Status of the Households of the Graduates of the Baroda University and Gujarat University

Income Group (Rs.)	*Economic Status*	*Baroda University (1961-75)*	*Gujarat University (1970)*
1	*2*	*3*	*4*
Below 5,000	Poor	40.8	39.0
5,001 to 10,000	Middle	32.2	35.0
Above 10,000	Rich	27.0	26.0
All		100.00	100.0

Source: Gujarat University—*Optimum Utilization of Educational Expenditure in Gujarat*—D.T. Lakdawala and K.R. Shah, Sardar Patel Institute, Popular Prakashan, Bombay, 1978.

TABLE 1.7

Classification of Respondents by Nature of Employment

Employment in	*Our Sample (1979)*	*Census (1971)*
1	*2*	*3*
Public sector	57.53	63.27
Private sector	23.55	26.19
Self-employed	18.92	10.54
Total	100.00	100.00

Source: Census of India (1971), Part VII (i)—Degree-holder and Technical Personnel. Special tables : G I—G II, p. 152.

Note: We have excluded diploma and certificate holders from the census data to make it comparable with our data.

TABLE 1.8

Ratio of Earnings by Sector of Employment

Education (in years)	*Self-employed*		*Public sector*		*Private sector*		*All*
1	*2*		*3*		*4*		*5*
15	12429	1.00	10104	1.00	7267	1.00	9605
16	12629	1.016	11044	1.093	9063	1.247	10912
17	15000	1.206	11698	1.151	9228	1.270	11774
18	19159	1.541	13494	1.335	19913	2.740	16222
19	22000	1.770	17299	1.712	13782	1.897	18684
20 and above	24000	1.930	19730	1.952	16980	2.336	19831
All	16924		12344		8050		12393

TABLE 1.9

Occupational Rank

No. Sr.	Occupations	Parents			Brothers and Sisters		
		Average earning 1979 (In Rs.) N=122	*Average Amount of Education*	*Rank*	*Average earning 1979 (In Rs.) N=234*	*Average Amount of Education*	*Rank*
1		*2*	*3*	*4*	*5*	*6*	*7*
1.	Small business	3262	6.5 (52)	3	4500	11 (66)	3
2.	Workers (unskilled)	4218	4.9 (39)	1	4900	9.7 (160)	1
3.	Primary school teacher	3900	7.5 (15)	4	5308	12.9 (160)	5
4.	Workers (skilled)	6300	8.5 (17)	6	5500	9.8 (59)	2
5.	Chemist	—	—	—	—	—	—
6.	Clerks	7831	10.7 (247)	7	6558	13.9 (1364)	7
7.	Technical persons	4470	11.5 (23)	8	9720	14.0 (84)	8
8.	Agriculture	7089	5.6 (50)	2	24000	11.0 (11)	4

TABLE 1.9 (Contd.)

1	2	3	4	5	6	7
9. Secondary school teacher	8850	16.0	11	8295	16.0	11
10. Engineer	—	—	—	10793	15.4 (216)	9
11. Big business	16593	8.4 (298)	5	14058	13.7 (519)	6
12. Officer	11320	14.1 (212)	9	15870	15.5 (171)	10
13. University teacher	—	—	—	21000	19.5 (39)	14
14. Executive	19200	20.0 (60)	12	15900	16.5 (66)	12
15. Professor	28000	14.7 (191)	10	21809	17.4 (279)	13

(Contd.)

Table 1.9 (Contd.)

Sr. No.	Occupations	Parents			Brothers and Sisters		
		Average earning 1979 (In Rs.) N=244	Average Amount of Education	Rank	Average earning 1979 (In Rs.) N=600	Average Amount of Education	Rank
	1	8	9	10	11	12	13
1.	Small business	—	—	—	3793	8.4 (118)	3
2.	Workers (unskilled)	—	—	—	4681	8.0 (199)	2
3.	Primary school teacher	4288	16.3 (49)	5	5490	10.0 (244)	4
4.	Workers (skilled)	7200	15.0 (15)	1	5867	10.1 (91)	5
5.	Chemist	7050	16.0 (32)	3	7050	16.0 (32)	10
6.	Clerks	7703	15.7 (1242)	2	7255	14.3 (2853)	7
7.	Technical persons	9000	16.7 (50)	7	8569	14.3 (57)	8

(Contd.)

TABLE 1.9 (Contd.)

8.	Agriculture	—	—	—	8780	6.1 (61)	1
9.	Secondary school teacher	9522	17.3 (381)	9	9079	16.6 (621)	12
10.	Engineer	13888	16.4 (279)	6	12490	15.2 (495)	9
11.	Big business	12615	16.2 (210)	4	13450	12.0 (1007)	6
12.	Officer	14963	16.9 (779)	8	15460	16.1 (1162)	11
13.	University teacher	19624	19.5 (331)	12	19769	19.5 (370)	15
14.	Executive	25874	18.0 (90)	11	20881	18.0 (216)	14
15.	Professor	18583	17.7 (636)	10	21260	17.0 (1106)	13

TABLE 1.10

Amount of Education, Average Earnings and Average Age of Respondents

Year	*15 years of Education*		*16 years of Education*		*17 years of Education*		*18 years of Education*	
	Average age	*Average earnings*	*Average age*	*Average earnings*	*Average age*	*Average earnings*	*Average age*	*Average earnings*
1	*2*		*3*		*4*		*5*	
1975	26.45	8499	27.39	7666	26.90	8043	29.81	11229
1970	31.38	9067	33.30	10851	32.93	12320	35.23	12285
1965	35.58	14599	35.83	14122	38.00	21670	36.90	27281
1961	41.67	16964	40.75	13710	40.00	24753	43.37	19795
All	29.38	9579	31.19	9769	33.23	11897	35.13	16394

Table 1.10 (Contd.)

Year	*19 years of Education*		*20 years of Education*		*Above 20 years of Education*	
	Average age	*Average earnings*	*Average age*	*Average earnings*	*Average age*	*Average earnings*
1	*6*		*7*		*8*	
1975	34.33	16200	30.00	20064	49.00	17268
1970	32.75	18750	—	—	30.00	10800
1965	37.00	17875	37.00	22344	38.00	17520
1961	38.07	27751	43.33	27660	49.00	17751
All	35.46	20037	37.83	24242	46.00	17112

Notes and References

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9. Jacob Mincer, "Education, 'Experience and the Distribution ot Earnings and Employment : An Overview", in op. cit., F. Thomas Juster (ed.), *Education, Income and Human Behaviour*.
10. *Ibid.*, p. 91.
11. *Ibid.*, p. 72.
12. *Ibid.*
13. Op. cit., Lester C. Thurow, *Education and Economic Equality*, pp. 357-359.
14. Laftwich and Sharp, *Economics of Social Issues*, Library of Congress Catalogue, USA, 1978.

15. MSU, being an English medium university. attracts students from all over India and abroad. Therefore, though our sample is apparently of a single university, it is fairly representative of a cross-section of Indian society.

2

Equity Issues in Higher Education

Introduction

SUBSIDIES can be conveniently classified into 'general'/'over-all' and 'specific'. Specific subsidy can further be broken down into public and private subsidies. General subsidy is defined as pricing education service below cost, e.g., tuition and hostel fees. It is enjoyed by *all* students irrespective of economic or social groups to which they belong. Specific public subsidy, on the other hand, is directed towards students who are not only economically backward but also educationally and socially secluded. They comprise 'disadvantaged' groups, e.g., scheduled caste/tribe students. That is why the amount of subsidy not only covers tuition fees but also other educational expenses.[1] But for this, they would not have gone for voluntary education. Students belonging to groups other than the disadvantaged one are not so treated. The criteria frequently put forth for the justification of public subsidy, namely, (a) inability to pay the fees, (b) inadequate value perception on the part of parents belonging to certain strata of society, and (c) benefits of higher education should largely be social and only marginally personal and 'cultural' in the main, seem to be most appropriate to 'specific' public subsidy meant for uplifting the backward communities. On the contrary, the other two categories of students, namely, 'Economically Backward Class' (E.B.C.)[2] and 'Aided' may not necessarily form a part of backward communities like scheduled castes and scheduled tribes. Their education is subsidised on merit-cum-need basis—college free-studentship and merit scholarships are instances at point. The residuals are categorised as 'unaided' students. They enjoy 'general' but not 'specific' subsidy.[3] Specific private subisdy

(also known as 'indirect' subsidy), takes the form of subsidised room and board (community/caste hostels) and book aid.

The structure of subsidy that has evolved over time, thus, is meant to serve the equity objective.[4] What is the extent of 'general'/ 'overall' and hostel subsidies ? What proportion of 'private' cost of education is covered by 'general' and 'specific' subsidies ? What is the extent of subsidies enjoyed by different categories of students classified as B.C., E.BC., Aided and Unaided ? How are overall and specific per capita subsidies distributed among the different categories of respondents in relation to their per capita incomes ? What is the share of, say, bottom 20 per cent and top 20 per cent in income and subsidy ? Has it altered the relative participation of various categories of students ? Has it narrowed schooling inequalities ? We propose to examine these questions with respectt o the M.S. University of Baroda on the basis of secondary data collected from the records of the various faculties and institutions of the university covering the period 1961-1980, and also on the basis of primary data collected from a 5 per cent sample of graduates of the four bench-mark years.

In this context, the first three hypotheses mentioned in the first chapter are empirically tested here, which say that the proportion of students whose education is heavily subsidised should show a faster increase in enrolment *vis-a-vis* other students and *vis-a-vis* their share in total population. Assuming that educational distance between various categories of students has narrowed, we can further hypothesise that the educational distance between generations, i.e., parents and their children, should have also *pari passu* narrowed.

This chapter is divided into five sections corresponding to five basic questions raised earlier. The first section deals with the question of 'general' subsidy. The second section is on the subsidies enjoyed by the four officially recognised categories of students and the proportion of private costs covered by two broadly classified subsidies. The third section, on the trends in enrolment of students during the period 1961-1980, aims at evaluating the impact of subsidised higher education on the relative participation of various categories of students comprising different socio-economic groups. The fourth section examines the issue of educational distance between generations, focusing on the dynamic characteristics of distribution of educational opportunities

over time. The final and the fifth section summarises the main findings and offers some concluding observations.

I

OVER-ALL SUBSIDY

What is the extent of subsidisation of higher education ?

Let us first take the general subsidy enjoyed by *all* students. The over-all subsidy is treated as equal to the institutional cost per pupil (public costs) less per pupil contribution by the way of fees—tuition, examination and others—the burden of which falls on students or their families. Over-all subsidy seems to have increased over time. With regard to the M.S. University of Baroda, of the total per pupil institutional cost of Rs. 853 in 1960-61, the students contributed Rs. 245 per head—the subsidy amounting to Rs. 608 or 71 per cent of the institutional cost. In 1969-70, it remained at that level but was higher at about 4/5th of the institutional cost in 1977-78. In the other two universities—Gujarat University and Sardar Patel University where only post-graduate students are admitted—the subsidy ranged from 3/4th to more than 4/5th in 1969-70 (Table 2.1).

Per pupil hostel receipt less per pupil disbursement gives per pupil subsidy. With regard to the Baroda University, it has increased substantially over the last twenty years. In 1960-61, it was Rs. 22 which went up to Rs. 499 in 1979-80—an increase by 22 times. Similarly, for Gujarat University per pupil subsidy increased from Rs. 64 in 1960-61 to Rs. 211 in 1969-70, giving an increase of more than three times. For the Sardar Patel University, on the contrary, per pupil receipt (revenue) exceeded per pupil disbursement during 1960's, revealing self-financing of hostel service (Table 2.2).

Subsidisation of institutional cost reveals the price charged/paid by educational institutions/students for the provision/purpose of education. The extent of price charged below full cost amounts to 80 per cent.

Per pupil hostel subsidy expressed as a proportion of per pupil receipt (hostel) of 14 per cent in 1960-61 was as high as 145 per cent in 1975-76—certainly revealing a quite alarming extent of subsidy.

Thus, full-cost pricing of higher education is a far cry. Had higher education been priced at full cost, the entire institutional cost/hostel cost would have been met by students or their families. Since this was not to be the case, students or their families enjoy 'notional' subsidy in the sense that subsidy in 'cash' is not received by them.

What is the proportion of total private cost of education covered by general public subsidy ? Private costs cover recorded fee cost as well as unrecorded non-fee costs (books, equipment, maintenance, etc.) plus earnings foregone (Table 2.3). It works out to Rs. 2687 on average per annum for the period 1961-75. Average general subsidy is estimated to be Rs. 720 (Table 2.4) covering around 27 per cent of the total private cost. Non-tuition private cost on average has worked out to Rs. 806. Eighty-nine per cent of it has been covered by average over-all public subsidy.

'Earnings foregone' is again a notional phenomenon. It is the amount foregone by students by choosing to pursue studies rather than to do gainful work. Here, alternative to education is assumed to be productive employment. It is observed that the value of students' time increases with economic growth and with that the share of earnings foregone. The opportunity cost forms one-half of the total factor cost of education. According to Pandit's[5] estimate in 1965-66, earnings foregone was higher by 34 per cent than what it was in 1960-61. Assuming the same percentage increase in earnings foregone, in 1969-70 and 1974-75, it was calculated to be Rs. 1695 and Rs. 2271 respectively. Average earnings foregone (average of four bench-mark years—1961, 1965, 1970 and 1975), on this basis, works out to be Rs. 1544. On average, general public subsidy has covered around 47 per cent of the opportunity cost (see Table 2.4). This is by no means a negligible proportion. However, over the period the proportion of average opportunity cost covered by average subsidy has fallen from 64 per cent in 1960-61 to 34 per cent in 1964-65.

In this way, relating only general public subsidy to different private costs of education shows that the extent of subsidisation varies from more than one-fourth to four-fifth. Thus, higher education is considerably subsidised. The extent of subsidisation noted here, to repeat, has nothing to do with the social and economic background of students.

As is made clear, we are particularly interested in the extent of

subsidies enjoyed by the first three (B.C., E.B.C., and Aided) of the four categories of students. In the case of the last category (i.e., unaided students), barring over-all subsidy, other educational costs are borne by them or their families.

II

ESTIMATES OF SUBSIDIES BY CATEGORY OF STUDENTS

Like the 'unaided' students, the scheduled caste/tribe, economically backward class and aided students enjoy overall public subsidy. The coverage of over-all subsidy varies by category of students. In the case of unaided students, the coverage is minimum since their fee cost is not all met by either specific public or private subsidy.

With regard to SC/ST students, fee cost (tuition, examination and others) is entirely borne by the government. This means that the entire 'institutional' cost takes the nature of over-all public subsidy since no part of it is covered by fee income. In addition to this, their maintenance cost incurred while studying is also met by the government. To this, we can add private subsidy, the information about which is supplied by our respondents. Thus, the maximum coverage of educational costs by various forms of subsidy appears to be in the case of SC/ST students. Between this minimum and maximum coverage of subsidised higher education lie the other two categories of students, namely, E.B.C. and aided students. With regard to them, specific public subsidy covers their fee cost either partially or fully. They are also the beneficiaries of specific private subsidy. The combination of all the three types of subsidy—general public subsidy, specific public subsidy and specific private subsidy—is presented in this section to obtain as realistic a picture as possible of subsidised higher education.

Information about subsidy supplied by our graduate respondents is given in Table 2.5. Average specific public subsidy accounts for more than four-fifth of the total in all the three categories. In absolute terms, the total specific subsidy of Rs.760[6] in respect to B.C. graduates is twice that of E.B.C. and aided graduates. In the case of B.C. the entire specific subsidy is meant to cover maintenance and non-tuition costs whereas in case of E.B.C. and aided, it covers largely the tuition cost.

The total view of the subsidy made available to four categories of graduates can be had by presenting together the three types of subsidies mentioned earlier. Table 2.6 is suggestive in this respect. The total subsidy of Rs. 1782, Rs. 1070 and Rs. 1051 per annum granted to B.C., E.B.C. and Aided graduates is around 2.5 times and 1.5 times respectively the subsidy of Rs. 720 enjoyed by 'unaided' graduates. Cost and subsidy picture depicted earlier enable us to say something about the extent of costs covered by subsidy availed of by the four categories of graduates (Table 2.6).

The specific public subsidy of Rs. 760 availed of by B.C. graduates has not only fully covered unrecorded non-tuition and maintenance costs but has left some surplus. Taking only 'extra' living or maintenance cost (Rs. 505), the surplus amounts to Rs. 255. In the case of E.B.C. graduates, the average specific public subsidy of Rs. 316 has fully met the average tuition cost of Rs. 303. Average specific private subsidy is enjoyed by 50 per cent of E.B.C. graduates. It is worked out to Rs. 126 plus Rs. 13 saved after meeting the tuition cost. The proportion of unrecorded non-tuition and maintenance costs covered by the average specific private subsidy amounts to 19 per cent and 28 per cent (taking only 'extra' cost of living given in parentheses in Table 2.3).

The average specific public subsidy covers approximately 95 per cent of the average tuition cost of 'aided' graduates. Average specific private subsidy, on the other hand, has met around 17 per cent to 25 per cent of the unrecorded costs. These proportions of private costs covered by different kinds of subsidy to E.B.C. and aided graduates are worked out on the assumption that those who pursue further education staying at home have also to bear maintenance (living) cost. On the contrary, if we exclude the living cost of students on the ground that they are otherwise also to be maintained by their families, the average specific private subsidy covers fully the unrecorded non-tuition cost (books, stationery, equipment, transport, etc.) of 50 per cent of E.B.C and around one-third of aided graduates who happen to be the recipients of such aid in our study.

Per capita general subsidy works out to Rs. 291 for B.C. and Rs. 294 for E.B.C. households. It is Rs. 323 and Rs. 422 for unaided and aided households respectively. In relation to per capita income, more general subsidy per capita has gone to

households having quite high per capita income. This is more succinctly brought out by general subsidy per family worked out by multiplying per capita general subsidy by the ratio of graduates to households (Table 2.7). The highest general subsidy of the order of Rs. 1069 given to 'aided' households is twice that of Rs. 524 for B.C. households. In this sense, general subsidy is undoubtedly less egalitarian. This is to be contrasted with the structure of specific public subsidy which, as pointed out before, has been particularly evolved to counteract the non-salutary effect on the distribution of educational facilities of especially general public subsidy (as an antidote to non-egalitarian general public subsidy).

Around 18 per cent of our respondents over the period stayed in hostels during their studies (Table 2.8). This compares favourably with that of 19 per cent obtained for the university as a whole for the decade 1960's and that of 17 per cent in 1979-80. Of the total number of respondents who stayed in hostels, around 50 per cent were 'unaided' students, one-third were 'aided', 13 per cent E.B.C. and roughly 6 per cent were B.C. students.

More than one-half (58 per cent) stayed in university hostels. Of those who stayed in university hostels, unaided students accounted for 57 per cent, and aided and E.B.C. formed 30 and 13 per cent respectively. B.C. students were the inmates of hostels meant for backward communities (Table 2.9).

What about the 'economic status' of those who were the beneficiaries of subsidised hostel (especially university hostels) facilities? In Table 2.10 we have classified the four categories of our respondents according to the income earned by their parents when they were students. It can be seen that only one-third belonged to the income group, Rs. 5000 and below (carrying 'poor' economic status). Unlike E.B.C. and aided graduate respondents, most of whom belonged to 'low' and 'middle' income groups (100 per cent in the case of E.B.C. and 80 per cent in the case of aided), 57 per cent of the unaided graduate respondents belonged to the income group Rs. 10,001 and above ('high' economic status). The said proportion is higher than that of 45 per cent obtained, for *all* unaided respondents in our sample. Moreover, per capita annual income of the households of respondents who were the beneficiaries of heavily subsidised university hostels at the time they were studying, was Rs. 1866 as against

that of Rs. 1448 of those who stayed in other than university hostels. Further, per capita income of households of 'unaided' respondents, again the beneficiaries of subsidised university hostels, was Rs. 3506 per annum—nearly two to two-and-a-half times of that of their counterparts among 'E.B.C.' and 'Aided' respondents.

In this way, the beneficiaries of subsidised university hostels appear to be 'unaided' well-to-do students and undoubtedly there is no justification for the continuation of hostel subsidy to the extent it is now. In this sense, hostel subsidy and general subsidy are undoubtedly less egalitarian.

Specific (public+private) subsidy per capita by category of respondents is detailed in Table 2.7

It can be seen that per capita specific subsidy of Rs. 148 for B.C. households is the highest, followed by that of Rs. 83 for E.B.C. and Rs. 72 for aided households. The highest is twice the lowest per capita specific subsidy, which sounds quite rational in relation to per capita income. For B.C. households the per capita annual income of Rs. 440 is one-half that of Rs. 1013 for aided households.

Thus, unlike general subsidy, per capita specific subsidy and per capita income seem to be inversely related and thus less non-egalitarian. However, the relationship is far from perfect as E.B.C. households whose per capita annual income is the lowest (Rs. 352) should account for the highest per capita specific subsidy. Per capita specific subsidy as a proportion of per capita income works out to 33.6 per cent, 23.6 per cent and 7.1 per cent for B.C., E.B.C. and aided households, respectively.

A more precise picture about the distribution both of income and specific subsidy can be had by finding out the share of bottom and top 20 per cent of respondents' households in both of them. We have supplied the relevant information for each category of households separately in Table 2.11. The share of bottom 20 per cent in income for all the three categories of respondents hovers around 6 to 7 per cent as against the share of around two-fifth (36 to 40 per cent) of top 20 per cent. Unlike this, the share of bottom 20 per cent in specific subsidy is in the range of 16 to 22 per cent, nearly two to three times their share in income. On the contrary, the share of top 20 per cent in specific subsidy is approximately one-half (20 to 24 per cent) their share in income. Furthermore, even if we take bottom 20 per cent or 80 per

cent of households, in the language of Lorenz curves, the specific subsidy curve is almost falling on the line of perfect equality.

In sum, it could be said that the extent to which educational distance between various categories of socio-economic groups and that between generations has narrowed, could mainly be ascribed to the fair distribution of specific public subsidy.

The whole analysis ultimately boils down to this : Different ways of analysis of the subsidy issue adopted here, though not startling, reveal a few new things. As was expected, higher education of B.C. graduates is subsidised to the extent of being provided virtually free. There is a wide gap in the degree of subsidisation of higher education of B.C. and E.B.C. graduates though, as observed previously, there is not much to distinguish between them in terms of their 'economic status'. Among E.B.C. graduate families, though economically much inferior to aided graduate families, subsidisation of higher education of E.B.C. category seems to be a shade better relative to aided graduates. There might be under-reporting of family income to comply with the income limit prescribed by the State in order to avail of this benefit. Probably they might not have disclosed the 'aid' procured from more than one source at a time, which is not uncommon. This would be the case more frequently with the 'aided' students who have access to other sources than with the E.B.C. students because of their social connections.

III

TRENDS IN THE COMPOSITION OF ENROLMENT OF STUDENTS AT THE BARODA UNIVERSITY: 1960-61 TO 1979-70

In this section the impact of subsidised higher education on enrolment is examined. In terms of the degree of 'subsidisation', graduates of four categories are arranged in this order: (a) B.C. graduates, (b) E.B.C. graduates, (c) Aided graduates, and (d) Unaided graduates.

In Table 2.12 are presented the trends in the composition of enrolment of the four categories of students during the preceding two decades in the Baroda University. Total enrolment during the sixties gives an annual compound growth rate of 6.12 per cent. The annual compound growth rate of 6.28 per cent for unaided

students, as expected, is slightly better than that of the over-all growth rate. As against this, the compound annual growth rates of 9.27 per cent and 14.45 per cent for B.C. and E.B.C. students respectively are higher than those for both total enrolment and unaided students. But the annual compound growth rate for aided students of 4.19 per cent is the lowest. Furthermore, the highest growth rate in enrolment should have been according to our hypothesis with respect to B.C. students followed by E.B.C., aided and unaided students.

What about the 1970's decade? The annual compound growth rate of 1.71 per cent for the total enrolment gives a fall of 72 per cent at the margin in the growth rate compared to 6.12 per cent growth rate for the decade preceding 1970s. Decline in annual compound growth rates (similarly) has been observed separately for all the four categories of students—the highest being in case of 'aided' students (97 per cent), followed by E.B.C. students (82 per cent), 'unaided' students (68.5 per cent) and B.C. students (42 per cent). The higher annual compound growth rate of enrolment obtained for the decade 1960's could, to some extent, be accounted for by the under-reporting of enrolment of students category-wise in the initial years of that decade because of the absence of up-to-date records with some faculties of the university.

However, the annual compound growth rates of 5.38 per cent and 2.56 per cent for B.C. and E.B.C. students respectively during the decade of 1970s are in conformity with our hypothesis. The only snag that has been observed is with regard to aided students. Their growth rate (0.14 per cent) should have been higher than that of the total enrolment.

For the entire period under review, the faster growth rates in enrolment have been observed with respect to both B.C. and E.B.C. students.

The analysis of enrolment trend by category of students further leads us to hypothesise that the categories which have shown rapid increase in enrolment should consequently form a higher proportion in the total enrolment. The proportionate enrolment of B.C. students to total enrolment of 1.52 per cent in 1961-62 rose to 1.97 per cent in 1969-70. In the following year it was 2.07 per cent and further higher at 3.05 per cent in 1979-80, notwithstanding fluctuations in the proportion during intervening years. Thus, the proportionate share of B.C. students

during the last twenty-year period has doubled. Similarly, the proportionate share of E.B.C. students has also steadily risen from 2.14 per cent in 1961-62 to 4 23 per cent in 1969-70. It further rose to 4.69 per cent in 1970-71 and to 5.26 per cent in 1979-80. Their highest share in any one year was 9.26 per cent during the sixties and 9.25 per cent during the seventies. Thus, their proportionate share has more than doubled (nearly 2.5 times) over the period. The proportionate share of aided students has steadily declined from 23.55 per cent in 1961-62 to 19.97 per cent in 1969-70. It has further fallen to 19.09 per cent in 1970-71 and to 16.87 per cent in 1979-80. Barring one year over such a long period, the share of aided students in total enrolment has not reached the 1961-62 proportion. In most of the years under review, the unaided students have dominated the enrolment scene by accounting for three-fourth of the total enrolment. It has moved up slowly from 72.80 per cent in 1961-62 to 72.23 per cent in 1969-70. It has further gone up to 74.14 per cent in 1970-71 and to 74.81 per cent in 1979-80. Unaided students, it seems, have simply retained their share unlike B.C. and E.B.C students whose share has improved (Table 2.13).

In terms of human capital analysis, the human capital market seems to have become more perfect for B.C. and E.B.C. students. In terms of incremental costs and returns, the faster increase in enrolment with regard to B.C. and E.B.C students tantamounts to 'optimising' behaviour on their part. As we shall see in the following chapters, their average and marginal returns (alternatively, lower incremental costs) are higher than aided and unaided categories. Despite this, the share of 'unaided' students has continued to be as high as around three-fourth. This possibly reflects the high extent of 'consumer surplus' enjoyed by them. They could afford a 'competitive' price of education service.

In this way, though the enrolment is predominantly in favour of unaided students, the tendency of relative improvement in the shares of B.C. and E.B.C. students can be clearly seen. The impact of subsidised higher education on the composition of enrolment is thus positively favourable.

Relative Enrolment Ratio (RER) presented in Table 2.14 further lends support to our earlier observation. RER is worked out by dividing the proportion of enrolment of B.C./E.B.C. students to total enrolment (numerator) by the proportion of

enrolment of aided/unaided students to total enrolment (denominator). RER for B.C. and E.B.C. students separately in terms of enrolment of aided students has trebled, whereas in terms of enrolment of unaided students it has doubled.

How does this movement of the proportion of B.C. students to total number of students enrolled in the Baroda University compare with their (B.C.'s) share in the total population of Baroda District and Gujarat State? In Table 2.15 Relative Participation Rate (RPR) of the B.C. students of the Baroda University is given. RPR is worked out by dividing the proportion of B.C. students to total enrolment (numerator) by the proportion of SC/ST population to total population of Baroda district and Gujarat State (denominator). It shows that their relative participation rate has doubled during the decade of 1960s.

How does this ratio, namely, RPR obtained for B.C. students compare with the similar ratios worked out for E.B.C., aided, and unaided students (i.e. non-SC/ST students)? Relative participation rate obtained for B.C. students not only compares favourably with that of E.B.C and aided students but also is higher than that of both E.B.C. and aided students. The participation rate for unaided students is as high as the share of non-SC/ST population in the total (see Table 2.16). The gap in the participation rate between B.C. students and unaided students has considerably narrowed during the reference period. The gap which was three-fourth $\left(\frac{0.26}{1.00}\right)$ in 1961-62 came down to roughly one-half $\left(\frac{0.53}{1.00}\right)$ in 1971-72. Thus the subsidisation of higher education appears to have set the trend in bridging the educational distance between various categories of students.[7]

IV

EDUCATIONAL DISTANCE BETWEEN GENERATIONS

Proceeding further on the basis of the finding of the previous section that the educational distance between various categories of students has narrowed, we can hypothesise that the educational

distance between generations, i.e., parents and their children should have also *pari passu* narrowed.

A comparison of educational attainment of heads/parents (both males and females) with that of their children is presented in Table 2.17.

The heads of respondents' households without any formal schooling (i.e., illiterates) account for 4.45 per cent of the total. The proportion of illiterate children, on the other hand, is barely half a per cent. The heads whose schooling ranges from one year to ten years form 39.7 per cent of the total whereas their children with corresponding years of schooling account for 11.3 per cent of the total. Heads are normally 'males' in Indian society. It is a fact that the educational attainment of males far exceeds that of the females which in our case implies that when females' educational attainment is combined with that of males, the proportion of parents (both males and females taken together) without any kind of formal schooling shoots up to 7.53 per cent from 4.45 per cent (see figures in parentheses given in Table 2.17). Only exception is parents with formal education up to ten years accounting for a higher proportion of 53 per cent. The relative ratio of schooling of parents and their children upto ten years works out to 1:0.21 (or 5:1), i.e., as against 5 parents with schooling, up to 10 years, only one child has ten and below ten years of schooling.

The proportion of children who are matriculates and above but not graduates is about 22 per cent as against that of nearly 27 per cent for heads (for parents, it is 17 per cent).

Heads with 15 and more years of schooling (i.e., graduates and above) account for 22 per cent of the total (on the other hand, parents with 15 years and more years of education form 12 per cent of the total). Corresponding proportion for their children is as high as 67 per cent. The relative ratio of 1:3.4 (or 1:5.48) implies that as against one head/parent with 15 and more years of schooling, 3 to 5 children have more than 15 years of schooling.

These ratios are completely in contrast in the sense that the ratio for higher education is reverse of the ratio for school education. Relative to children, more parents are with school education; relative to parents, more children are with higher education (i.e., college and university education). Thus, the present generation, consisting of younger persons, has on average more years of formal schooling than the previous generation. As against 10.5 years of

mean education of parents, mean education of children is 14.1 years.

How does the educational attainment of parents and their children compare when analysed in terms of category to which they belong (i.e., B.C., E.B.C., Aided and Unaided)?

Taking B.C. category first, the illiterate heads account for about 24 per cent of the total number of B.C. households. Illiteracy is absent, on the contrary, among their children. Three-fourth of heads of B.C. families have formal schooling ranging from primary to high school. Nobody has gone beyond that level (see Table 2.17). As a contrast, 50 per cent of their children have middle and high school education (i.e., 10 years of schooling) and the remaining 50 per cent have more than 11 years of schooling, of which 38 per cent are graduates (i.e., with 15 years of schooling).

Next is the schooling acquired by heads of E.B.C. households. The proportion of illiteracy is 10 per cent. No illiterate children are found in this category also. Sixty per cent of the heads of E.B.C. families have education ranging from one year to 10 years. In contrast, only 13 per cent of their children are similarly placed. As against 30 per cent of their children with 11 years of schooling only 13 per cent of heads have acquired 11 years of education. Fifty-seven per cent of E.B.C. children account for more than 11 years of schooling (of which 40 per cent have 15 years of schooling) as against 6 per cent obtained for the heads with more than 11 years of schooling.

For the last two categories of respondents' households, namely, Aided and Unaided, educational attainment of heads and children tells the same story. Heads in these two categories have more years of schooling to their credit in comparison to their counterparts in the first two categories. A higher proportion of children of aided and unaided households accounts for more than 11 years of schooling than that is accounted for by the heads. The respective proportions are 68 and 79 per cent (aided and unaided children respectively) for children and 24 and 35 per cent for heads. In this way, our analysis shows an improvement in the stock of human capital formed through investment in education of the present generation by the previous generation—the stock consisting of younger persons with more years of formal education.[8]

By and large the comparison made so far can be treated as *intra* category of respondents' households, i.e., the educational

attainment of children *vis-a-vis* their parents (heads only) within the category. Of equal or rather more significance is *inter* category comparison. It is this comparison that is expected to throw light on the educational distance between heads and children. The inter-comparison is found in Table 2.18. The ratio analysis is once again employed here for the purpose spelt out in the earlier paragraph. The ratios give us an idea of the inter-temporal equity in education. The ratios are estimated by dividing the proportion of heads/children of B.C./E.B.C. households with a given amount of schooling by the proportion of heads/children of aided/unaided households with an equal amount of schooling. The ratios so worked out and given in Table 2.18 reveal that they are higher for children than those for heads of B.C./E.B.C. households, showing the tendency towards inter-temporal equity in education. Let us study some of the crucial and interesting ratios. One such ratio is for 9-10 years of education (i.e., high school education).

The ratio of 0.80 for children of B.C. families (with reference to aided families) is eight times the ratio of 0.10 for the heads of B.C. families, i.e., the B.C. children with 8-10 years of schooling form 80 per cent of their counterparts coming from aided families. Heads of B.C. families have acquired schooling up to 10 years in our sample. No head is a matriculate or a graduate. In contrast to this, their children with 15 years of education account for nearly 14 per cent of the total number of aided graduates (0.14) and 10 per cent of the number of unaided graduates (0.10). It is as high as 50 per cent (0.50) of E.B.C. graduates. The ratio of 0.43 or 0.56 obtained for E.B.C. children with 11 years of schooling (with reference to aided and unaided families) is 3 to 4 times the similar ratio (0.14 or 0.13) obtained for heads of E.B.C. households. The ratios of 0.27 and 0.21 calculated for the E.B.C. children with 15 years of schooling with reference to the aided and unaided children respectively with 15 years of schooling are 5 to 7 times the ratios of 0.06 and 0.03 obtained for E.B.C. heads having 15 years of schooling.

Thus, the tendency towards inter-temporal equity is visible clearly.

By employing statistical measures of inequality such as Gini coefficient, coefficient of dispersion, log of variance and standard deviation, we can also examine the problem of inter-temporal equity in education. Inequality is reduced when the value of

coefficient obtained for children is lower than that for parents. Different values for parents and children are given in Table 2.19.

Coefficient of dispersion for education of parents is 1.18 whereas for their children, it is 0.67. Similarly, standard deviation of education for parents of 0.553 is much higher than the standard deviation of education of 0.283 for their children. Variance of education (anti-log) of 2.021 for parents is above that of 1.201 for their children. Gini coefficient of education of heads is 1.180 whereas that of children is 0.375. Gini coefficient of education works out to be 1.330 and 0.636 for heads and their children respectively when both have acquired schooling below 15 years.

The share of lowest 50 per cent of children in education of 42.27 per cent is better than that of 30.91 per cent for parents (Table 2.20).

Various measures of inequality of education show that the inequality is greater with respect to parents than children.

V

CONCLUDING OBSERVATIONS

General or over-all public subsidy has increased over time accounting for around four-fifth of the institutional public cost. The general subsidy reveals the extent to which the education service is priced below cost. Hostel subsidy tells the same story.

Absolute general subsidy is higher for B.C., E.B.C. and Aided categories of students and lowest for Unaided category. But per capita general subsidy in relation to per capita income shows a higher subsidy for Unaided and Aided categories. The number of graduates per household is around three for aided and unaided as against less than two for B.C. and E.B.C. households. Consequently, the general subsidy accruing to households of unaided and aided graduates is much greater than that going to households of B.C. and E.B.C. graduates. This suggests a more inegalitarian distribution of general subsidy than that is revealed by *absolute* general subsidy. Similarly, university hostel subsidy has gone more to the better off unaided students. It is clear that the beneficiaries of general and hostel subsidies are the Aided and Unaided categories which could probably explain the preponderance of these two categories, mainly Unaided, at the higher education level.

As an antidote, we have evolved a structure of subsidy intended to remedy the situation. What role has specific public subsidy played in attaining the objective of equality of educational opportunities ? Specific public subsidy forms approximately nine-tenth of the combined specific subsidy (both public and private). B.C. students do not have to pay tuition fees—being reimbursed by the State. In their case, entire public specific subsidy is meant to cover costs other than tuition. Even after covering these costs, a sizeable surplus remains. They are provided free hostel accommodation. In the case of E.B.C. and Aided, it is meant by and large for covering tuition and other educational costs. As against an average tuition cost of Rs. 303 per annum, E.B.C. and aided students received by the way of public specific subsidy Rs. 316 and Rs. 287 per annum on average respectively—almost meeting fully their tuition cost. Thus, higher euducation is mostly provided free to B.C., E.B.C., and aided graduates in the sense that not even a part of institutional cost is covered by 'fee' income. Private specific subsidy again is not insignificant since it has more or less fully met the unrecorded private costs of books, stationery etc. with regard to 50 per cent of E.B.C. and one-third of aided students who were the recipients of such aid. Earnings foregone does not appear to be as menacing as it looks.

How much egalitarian is the distribution of specific public subsidy ? Per capita annual specific public subsidy is inversely related to per capita income unlike general subsidy. Furthermore, the share of bottom 20 per cent of households in specific subsidy is about three times their share in income. On the contrary, the share of top 20 per cent of households in specific subsidy is one-half their share in income, though in absolute sense, their share exceeds the share of bottom 20 per cent. Thus, specific subsidy is more egalitarian.

Extent of subsidisation is greatest among B.C. candidates followed by E.B.C., Aided and Unaided. E.B.C. students deserve a better deal as the per capita specific subsidy is one-half that of B.C. though their per capita income is lower than that of B.C.

It has been proved by and large by the trend in enrolment of students over the past 20-year period that the proportionate increase has been faster with respect to those whose education is heavily subsidised, except in the case of 'Aided' category in whose case the compound annual growth rate is even lower than that

obtained for Unaided.

The association between specific subsidy and accelerated enrolment of the corresponding beneficiaries has served to bring about a negative correlation in supply-demand conditions. This also is an indication of the 'optimisation' behaviour. Equally interesting is the existing sizeable 'consumer surplus' for the unaided whose growth rate in enrolment is in consonance with the overall enrolment.

Consequently, B.C. and E.B.C. categories accounted for a higher proportion of the total enrolment by the close of the 1970's than what it was in the beginning of the 1960's. The share of Aided category has declined whereas that of Unaided remained unaltered at three-fourth of the total.

Consequent upon the improvement in the proportion of B.C. and E.B.C. students in total enrolment of students at the Baroda University, relative enrolment ratio and relative participation rate of B.C. and E.B.C. students compared to (a) aided and unaided students, (b) total SC/ST population of Baroda District and Gujarat, and (c) non-SC/ST population again of district and State have gone up, indicating an improved distribution of educational facilities. All this goes to show that the 'educational distance' between categories of students has narrowed. Thus, specific subsidy has a favourable and positive effect on the relative enrolment of students of various categories. We have also seen an increase in mean education of children (14.1 years of schooling) relative to that of their parents (10.5 years of schooling), implying thereby an improvement in the stock of human capital formed over the years.

Intra-category comparison (i.e., the educational attainment of children *vis-a-vis* their parents within the category) lead us to a similar conclusion. Inter-category comparison, resorted to for the purpose of examining the 'educational distance' across generations, shows that B.C. children are not only better educated than their parents but also relative to other categories of children. Thus, the tendency towards inter-temporal equity, both horizontal and vertical, in education is in the offing. Various measures of inequality further lend support to the earlier observation that the educational inequality between categories and generations is on the decline. The great significance of the observed tendency of less uneven distribution of educational opportunities lies in that the human capital formed is less discriminated.

To the extent higher education is dominated by the elite

(Unaided category in our analysis), the general and hostel subsidies demand a rethinking on the present financing of higher education in India. The issue is more pertinent when finances of universities of late are in the red.

To gauge the full impact of less discriminated human capital on the economy, questions such as determinants of earnings, occupational mobility and the personal distribution of income need to be studied in the human capital framework before anything conclusively could be said about the specific subsidy. In the remaining chapters to follow these questions are explored.

TABLE 2.1

Per Pupil General/Over-all Public Subsidy

(Rupees)

Year	*M.S. University of Baroda*			*Gujarat University*			*Sardar Patel University*		
	Per Pupil Institutional cost	*Per Pupil Fee Income*	*Per Pupil Subsidy (2—3)*	*Per Pupil Institutional cost*	*Per Pupil Fee Income*	*Per Pupil Subsidy (5—6)*	*Per Pupil Institutional cost*	*Per Pupil Fee Income*	*Per Pupil Subsidy (8—9)*
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
1960-61	852.66	244.69	607.97 (71.30)	2825.78	233.91	2491.87 (91.72)	1684.59	288.93	1395.66 (82.85)
1969-70	1079.27	310.43	768.84 (71.30)	2280.45	307.04	1973.41 (86.54)	1910.97	463.86	1447.11 (74.16)
1977-78	2015.00	430.78	1584.22 (78.62)	—	—	—	—	—	—

Note: Figures in parentheses are percentages of subsidy to institutional cost.

Source: 1. D.T. Lakdawala and K.R. Shah: "Optimum Utilization of Educational Expenditure in Gujarat". Monograph series-5, Sardar Patel Institute of Economic and Social Research, Ahmedabad, 1978. Distributors: Popular Prakashan, Bombay.

2. *M.S. University Statement of Accounts for the year 1979-80 and the Yearbook.*

TABLE 2,2

Per Pupil Hostel Subsidy

(In Rupees)

Year	*M.S. University of Baroda*	*Gujarat University*	*Sardar Patel University*
1	*2*	*3*	*4*
1960-61	— 22	— 64	+11
1965-66	— 34	—160	+31
1969-70	— 86	—210	—
1975-76	—210	—	—
1979-80	—499	—	—

Note: Per pupil hostel subsidy=Per pupil receipt—Per pupil disbursement. With regard to Baroda and Gujarat Universities Per pupil disbursement exceeds Per pupil receipt showing deficit (—) whereas with regard to Sardar Patel University the receipt exceeds disbursement, giving surplus (+).

Source: 1. M.S. University (1975-76, 1979-80): M.S. University Budgets.
2. D.T. Lakdawala and K.R. Shah: "Optimum Utilization of Educational Expenditure in Gujarat", Table III-1, pp. 161-62.

TABLE 2.3

Resource Costs of Education

(In Rupees)

Economic Status of Respondents	*Average Institutional cost*	*Average Private Cost of Education*				*Average Resource cost of education (2 to 6)*
		Recorded Fee cost	*Unrecorded Non-tuition cost*	*Unrecorded Maintenance cost*	*Earnings Forgone*	
1	*2*	*3*	*4*	*5*	*6*	*7*
Low (B.C./E.B.C.)	1022	303	123	625 (381)	1544	3617 (3373)
Middle (Aided)	1022	303	127	650 (397)	1544	3646 (3393)
High (Unaided)	1022	303	215	781 (477)	1544	3865 (3561)

Source: (1) K.R. Shah: "Outlay on Education and its Financing in India—1950-51 to 1960-61" (unpublished Ph.D. thesis), M.S. University, 1969.

(2) D.T. Lakdawala and K.R. Shah, "Optimum Utilization of Educational Expenditure in Gujarat"—Monograph Series-5, Sardar Patel Institute of Economic and Social Research, Ahmedabad, 1978.

Note: (1) Classification of respondents by economic status—low, middle and high- corresponds to those belonging to below Rs. 5000, Rs. 5001 to Rs. 10,000 and Rs. 10,001 and above annually respectively.

(2) All the cost components are averages of four terminal years, covering the period 1961-75. Institutional cost and fee cost relate to the M.S. University. Non-tuition cost includes expenditure on books, stationery, equipment, refreshment, private tuition etc. Maintenance cost is the cost of room rent and mess.

(3) Figures in parentheses in Col. 5 are the 'extra' cost of living of students staying in hostels estimated at 61 per cent of total maintenance cost.

TABLE 2.4

Average Resource Cost of Education, Private Costs and Earnings Forgone covered by Average Over-all Subsidy

(In Rupees)

Average Resource cost of Education	*Average Non-tuition Private costs of Education*	*Average Earnings Forgone*	*Average Over-all Subsidy*
1	*2*	*3*	*4*
2687	806	1544	720
(27)	(89)	(47)	

Note: (1) Figures in Cols. 1, 2, 3 and 4 are averages for the period covering 1961-1975.

(2) Figures in parentheses are the percentages of various costs in Cols. 1, 2 and 3 respectively covered by average over-all subsidy (Col. 4).

TABLE 2.5

Average Specific Public and Private Subsidy Per Year

(In Rupees)

Category of Graduates	N_1	*Average specific public subsidy*	N_2	*Average specific private subsidy*		*Total specific subsidy*
1		*2*		*3*		*4*
B.C.	17	731 (92.5)	5	100(29) (7.5)	831	(760) (100.0)
E.B.C.	31	316 (83.8)	15	126(61) (16.2)	442	(377) (100.0)
Aided	106	287 (86.4)	33	145(45) (13.6)	432	(332) (100.0)

Note: 1. Average specific public subsidy comprises B.C./E.B.C. scholarships, fees, college freeships, merit scholarships, teachers' sons, political sufferers, etc. We have excluded four respondents who got loan scholarships.

2. Average specific public subsidy is calculated in the manner explained below. The duration of aid ranges from 2 years to 6 years. We have summed up the absolute amount of subsidy and by dividing it by the total number of years of assistance we got per year absolute subsidy. This is divided by the number of recipients to obtain average specific public subsidy. Average private subsidy also is similarly calculated. It is mostly in the nature of book-aid. It is awarded by private charity trusts, caste or community organisations.

3. Figures in parentheses in Cols. 3 and 4 are average 'private' and average 'total' (i.e. Public+Private) subsidy respectively estimated by dividing the total amount of private subsidy by the total number of observations (include Aided+Unaided) rather than those who received such aid in fact.

4. N_1 = Number of observations.
   N_2 = Number of respondents who received aid—books etc.,—from private sources. Average specific private subsidy per year of Rs. 100, Rs. 126 and Rs. 145 relates only to them.

5. Figures in parentheses are the proportion of average specific public and private subsidy per year to total subsidy per year (column 4).

TABLE 2.6

Average Amount of Subsidy by Category of Respondent Graduates

(In Rupees)

Category of graduates	*Average over-all public subsidy (institutional)*	*Average specific public subsidy*	*Average specific private subsidy*	*Total average subsidy (2+3+4)*
1	*2*	*3*	*4*	*5*
B.C.	1022	731	29	1782
E.B.C.	1035	—	61	1096
Aided	1006	—	45	1051
Unaided	720	—	—	720

TABLE 2.7

General and Specific Subsidies per Capita in Relation to per Capita Income by Category of Respondents

Category of Respondents	*Per Capita General Subsidy*	*Ratio of Graduates to Households*	*General Subsidy According to Households*	*Specific Subsidy per Capita*	*Per Capita Income*
1	*2*	*3*	*4*	*5*	*6*
B.C.	290.89	1:1.8	523.80	147.97 (33.6)	440.2
E.B.C.	294.03	1:1.9	558.66	83.23 (23.6)	352.4
Aided	422.50	1:2.5	1068.90	71.97 (7.1)	1013.2
Unaided	323.02	1:2.7	872.00	—	2102.8

Note : 1. General and specific subsidies per capita (annual) are calculated by dividing both the subsidies per household by the average family size. Average family size relates to the number of persons in a household when our respondents were students.

2. Per capita income is worked out taking household income of our respondents at the time they were studying.
3. Ratio of graduates to households refers to the number of graduates per household.
4. General subsidy per family is estimated by multiplying per capita annual general subsidy (Col. 2) by the ratio of graduates to households (Col. 3).

TABLE 2.8

Respondents who stayed in Hostels while Studying

Category of Graduates	*1961 (N=32)*	*1965 (N=38)*	*1970 (N=69)*	*1975 (N=149)*	*Total (N=288)*	*Percentage*
1	*2*	*3*	*4*	*5*	*6*	*7*
B.C. (N=17)	—	—	1	2	3 (5.7)	(17.7)
E.B.C. (N=31)	1	1	2	3	7 (13.2)	(22.6)
Aided (N=106)	3	3	5	6	17 (32.0)	(16.0)
Unaided (N=134)	4	4	6	12	26 (49.1)	(19.4)
Total (N=288)	8 (25.0)	8 (19.0)	14 (20.3)	23 (15.4)	53 (100.0)	(18.4)

Note: 1. 'N' refers to the number of observations.
2. Figures in parentheses in the last row are the proportions of graduates who stayed in hostels to the total number of graduates in each *bench-mark year*.
3. Figures in parentheses (col. 6) are the percentages of hostelers category-wise to total number of hostelers (53).
4. Figures in parentheses in last column (No. 7) are the proportions of students who stayed in hostels to total number of graduates in each category.

TABLE 2.9

Classification of Respondent Graduates (Hostelers) by type of Hostel

(In percentages)

Type of Hostels	*Category of Graduates*				
	B.C.	*E.B.C.*	*Aided*	*Unaided*	*All*
1	*2*	*3*	*4*	*5*	*6*
University	—	57.1 (13.3)	64.3 (30.0)	60.7 (56.7)	57.7 (100.0)
Government	66.7	—	14.3	—	7.7
Diamond Jubilee trust	33.3	—	7.1	—	3.8
Caste/Community	—	28.6	—	3.6	5.8
Private or rented room	—	14.3	14.3	35.7	25.0
Total	100.0	100.0	100.0	100.0	100.0

Note: 1. Figures in parentheses in first row are the proportions of E.B.C., aided and unaided graduates (who stayed in university hostels) to total number of graduates who stayed in university hostels.

2. The proportions of graduates of 57.7 per cent and 25 per cent who stayed in university hostels and rented rooms respectively in our sample tally perfectly with those obtained for the 1965-66 sample. (See D.T. Lakdawala and K. R. Shah : 'Financing of Universities in Gujarat', *Economic and Political Weekly*, Vol. X, No. 20, May 17, 1975). The respective proportions are 57.6 per cent and 21.2 per cent.

TABLE 2.10

Classification of Respondent Graduates who stayed in Hostels by Income Groups

(In Percentages)

Income Group (Rs. per annum)	*Category of Respondent Graduates*				
	B.C.	*E.B.C.*	*Aided*	*Unaided*	*All (2—5)*
1	*2*	*3*	*4*	*5*	*6*
Upto 5,000	100.00	71.4	28.6	17.9	32.7
5,001—10,000	—	28.6	50.0	25.0	30.8
Above 10,001	—	—	21.4	57.1	36.5
Total	100.00	100.00	100.00	100.00	100.00

Note: A higher proportion of respondent graduates, other than B.C., who stayed in hostels belonged to 'middle' (Rs. 5001—Rs. 10,000) and 'high (above Rs. 10.001) income groups compared to that of all respondent graduates. For example, with regard to unaided graduates, 45 per cent belonged to the income group Rs. 10,001 and above, whereas for those unaided graduates who stayed in hostels, the corresponding proportion was as high as 57 per cent.

TABLE 2.11

Share of Households in Income and Specific Subsidy

(In Percentages)

Share (%)	*B.C. Households*		*E.B.C. Households*		*Aided Households*	
	Share in Household Income	*Share in Specific subsidy*	*Share in Household Income*	*Share in Specific subsidy*	*Share in Household Income*	*Share in Specific subsidy*
1	*2*	*3*	*4*	*5*	*6*	*7*
20	6.17	15.50	6.40	18.30	6.99	21.77
	(6.17)	(15.50)	(6.40)	(18.30)	(6.99)	(21.77)
40	12.22	23.13	11.12	24.06	13.14	18.29
	(18.39)	(38.63)	(17.52)	(42.36)	(20.13)	(40.06)
60	14.10	17.54	18.38	13.14	18.13	13.83
	(32.49)	(56.17)	(35.90)	(55.50)	(38.26)	(53.89)
80	31.50	23.83	24.21	21.50	22.60	22.27
	(63.99)	(80.50)	(60.11)	(27.17)	(60.86)	(76.16)
100	36.01	19.99	39.90	23.00	39.14	23.84
	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)

Note: Figures in parentheses are cumulative shares

TABLE 2.12

Trend in Enrolment by Category of Graduates

Year	*B.C.*	*E.B.C.*	*Aided (Freeship Holders)*	*Total Number of B.C., E.B.C. and Aided*
1	*2*	*3*	*4*	*5*
1961-62	136	192	2113	2441
1962-63	151	487	1898	2536
1963-64	137	955	2629	3721
1964-65	140	996	2308	3444
1965-66	158	699	2384	3241
1966-67	185	801	2907	3893
1967-68	228	1003	2919	4150
1968-69	287	671	1550	2508
1969-70	302	647	3058	4007
Annual Compound Growth Rate	9.27	14.45	4.19	5.66
1970-71	331	747	3041	4119
1971-72	351	752	2843	3946
1972-73	361	1467	2543	4361
1973-74	461	1384	2530	4375
1974-75	644	1462	2734	4840
1975-76	505	1147	3129	4781
1976-77	459	1174	2619	4252
1977-78	499	1076	2730	4305
1978-79	498	951	3298	4747
1979-80	559	962	3084	4605
Annual Compound Growth Rate	5.38	2.56	0.14	1.12
Annual Compound Growth Rate	7.72	8.85	2.01	3.40

(Contd.)

TABLE 2.12 (contd.)

Year	*Total Enrolment*	*Col. 5 to Col. 6 (%)*	*Unaided Students*
1	*6*	*7*	*8*
1961-62	8974	27.0	6533
1962-63	10314	25.0	7598
1963-64	10315	36.0	6594
1964-65	10954	31.0	7510
1965-66	11629	28.0	8399
1966-67	13223	29.0	9330
1967-68	14235	29.0	10085
1968-69	14396	17.0	11888
1969-70	15311	26.0	11304
Annual Compound Growth Rate	6.12	—	6.28
1970-71	15430	26.0	11811
1971-72	16590	24.0	12644
1972-73	17786	25.0	13425
1973-74	18551	24.0	14176
1974-75	23740	20.0	18900
1975-76	21138	23.0	16357
1976-77	20664	21.0	16412
1977-78	19486	22.0	15181
1978-79	19110	25.0	14303
1979-80	18281	25.0	13676
Annual Compound Growth Rate	1.71	—	1.98
Annual Compound Growth Rate	3.82	—	3.96

TABLE 2.13

Enrolment of B.C., E.B.C., Aided and Unaided Students to Total Enrolment

(*In Percentages*)

Year	*B.C.*	*E.B.C.*	*Aided*	*Unaided*	*Total*
1	*2*	*3*	*4*	*5*	*6*
1961-62	1.52	2.14	23.55	72.80	100.00
1970-71	2.07	4.69	19.09	74.15	100.00
1979-80	3.05	5.26	16.87	74.82	100.00

TABLE 2.14

Relative Enrolment Ratio

	A			*B*		
Year	*B.C.*	*E.B.C.*	*B.C. and E.B.C. combined*	*B.C.*	*E.B.C.*	*B.C. and E.B.C. combined*
1	*2*	*3*	*4*	*2*	*3*	*4*
1961-62	0.06	0.09	0.16	0.02	0.03	0.05
1970-71	0.11	0.25	0.35	0.03	0.06	0.09
1979-80	0.18	0.31	0.49	0.04	0.07	0.11

Note: Relative enrolment ratio is calculated as follows.

$$\text{R.E.R.} = \frac{\text{\% of B.C./E.B.C. enrolment to total enrolment}}{\text{\% of Aided/Unaided enrolment to enrolment}}$$

$$\text{e.g.} = \frac{1.52 \text{ (B.C. enrolment in 1961-62)}}{23.55 \text{ (Aided enrolment)}}$$

$$= 0.06$$

TABLE 2.15

Relative Participation Rate of B.C. Students of M.S. University

Year	*Population District*		*Population of Gujarat*		*Population of District and Gujarat Combined*	
	SC	*ST*	*SC*	*ST*	*SC*	*ST*
1	*2*		*3*		*4*	
1961-62	0.26	0.07	0.23	0.11	0.06	0.08
1971-72	0.53	0.13	0.45	0.22	0.10	0.15

Note : Relative Participation rate is worked out as follows :

$$RPR = \frac{\text{Percentage of B.C. students to total enrolment}}{\text{Percentage of SC/ST population to total Baroda District Population/Gujarat Population}}$$

$$\text{e.g.} = \frac{1.52}{5.92} = 0.26 \text{ (1961-62)}$$

TABLE 2.16

Relative Participation Rates of E.B.C., Aided and Unaided students to total NSC—Population of Baroda District and Gujarat

Year	*E.B.C.*	*Aided*	*Unaided*	*All three combined*	*Aided+ Unaided only*
1	*2*	*3*	*4*	*5*	*6*
1961-62					
District	0.03	0.32	1.00	1.36	1.33
Gujarat	0.03	0.29	0.91	1.23	1.20
1971-72					
District	0.06	0.24	1.08	1.39	1.33
Gujarat	0.06	0.22	0.96	1.24	1.18

Note : For the formula employed to work out the relative participation rate, see Note to Table 2.15.

TABLE 2.17

Educational Attainment of Heads and Children by Category of Households

Level of Education	*Educational Attainment of Heads (Males) of Respondents' Households*					*All Heads (Males and Females)*
	B.C.	*E.B.C.*	*Aided*	*Unaided*	*All (2—5)*	
1	*2*	*3*	*4*	*5*	*6*	*7*
Illiterate	4 (23.53)	3 (10.07)	4 (3.70)	2 (1.46)	13 (4.45)	(7.53)
Literate	— (—)	— (—)	— (—)	— (—)	— (—)	(—)
Primary	8 (47.06)	8 (26.27)	12 (11.11)	17 (12.41)	45 (15.41)	(25.00)
Middle	4 (23.53)	7 (23.23)	17 (15.74)	15 (10.95)	43 (14.73)	(20.89)
Secondary (below matric)	1 (5.88)	3 (10.02)	10 (9.26)	14 (10.22)	28 (9.59)	(7.02)
Matriculation	— (—)	4 (13.33)	29 (26.85)	32 (23.26)	65 (22.26)	(14.38)

(Contd.)

TABLE 2.17 (Contd.)

Level of Education	*Educational Attainment of Heads (Males) of Respondents' Households*					*All Heads (Males and Females*
	B.C.	*E.B.C.*	*Aided*	*Unaided*	*All (2—5)*	
1	*2*	*3*	*4*	*5*	*6*	*7*
Intermediate	—	—	6	7	13	
	(—)	(—)	(5.56)	(5.11)	(4.54)	(2.74)
Graduate	—	1	18	34	53	
	(—)	(3.33)	(16.67)	(24.82)	(18.15)	(9.96)
Postgraduate	—	—	2	1	3	
	(—)	(—)	(1.85)	(0.73)	(1.03)	(1.03)
Ph.D.s etc.	—	—	—	4	4	
	(—)	(—)	(—)	(2.92)	(1.37)	(0.68)
Other (Diplomas)	—	—	—	—	—	
	(—)	(3.33)	(—)	(2.19)	(1.37)	(0.68)
Not specified	—	3	10	9	21	
	(—)	(10.07)	(9.26)	(5.84)	(7.19)	(9.93)
All	17	30	108	137	292	594
	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)

(Contd.)

TABLE 2.17 (Contd.)

Level of Education	*Educational Attainment of Respondents' Brothers and Sisters*				
	B.C.	*E.B.C.*	*Aided*	*Unaided*	*All (8—11)*
1	*8*	*9*	*10*	*11*	*12*
Illiterate	—	—	1	—	1
	(—)	(—)	(0.97)	(—)	(0.40)
Literate	—	—	—	—	—
	(—)	(—)	(—)	(—)	(—)
Primary	—	—	—	—	—
	(—)	(—)	(—)	(—)	(—)
Middle	4	2	6	3	15
	(25.00)	(6.66)	(5.83)	(3.03)	(6.05)
Secondary (below matric)	4	2	5	2	13
	(25.00)	(6.66)	(4.85)	(2.02)	(5.24)
Matriculation	—	9	21	16	46
	(—)	(30.00)	(20.39)	(16.66)	(18.55)

(Contd.)

TABLE 2.17 (Contd.)

Level of Education	*Educational Attainment of Respondents' Brother and Sisters*				
	B.C.	*E.B.C.*	*Aided*	*Unaided*	*All (8—11)*
1	*8*	*9*	*10*	*11*	*12*
Intermediate	1	2	5	—	8
	(6.25)	(6.66)	(4.85)	(—)	(3.23)
Graduates	6	12	44	58	120
	(37.50)	(40.00)	(42.72)	(58.59)	(48.39)
Postgraduate	—	2	14	14	30
	(—)	(6.66)	(13.59)	(14.14)	(12.10)
Ph.D.s etc.	—	—	—	2	2
	(—)	(—)	(—)	(2.02)	(1.37)
Others (Diplomas)	1	1	7	4	13
	(6.25)	(3.33)	(6.80)	(4.04)	(5.24)
Not specified	—	—	—	—	—
All (N)	16	30	103	99	248
	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)

TABLE 2.18

Relative Participation Rates or Co-efficient of Equality by Levels of Education

Category of Households	*Middle (5 to 7 years of education)*	*Secondary (8 to 10 years of education)*	*Matriculation (11 years of education)*	*Inter-mediate (12 to 14 years of education)*	*Graduates (15 years af education)*	*Others (Diplomas, etc.)*
1	*2*	*3*	*4*	*5*	*6*	*7*
Heads:						
B.C.	0.24	0.10	—	—	—	—
	0.27	0.07	—	—	—	—
E.B C.	0.41	0.30	0.14	—	0.06	0.14
	0.47	0.21	0.13	—	0.03	—
Respondents' brothers and sisters (children)						
B.C.	0.67	0.80	—	0.20	0.14	0.14
	0.34	2.00	—	—	0.10	0.25
E.B.C.	0.33	0.40	0.43	0.40	0.27	0.14
	0.67	1.00	0.56	—	0.21	0.25

Note :

$$\text{RPR} = \frac{\%\text{ of B.C./E.B.C./Heads/Children with a given amount of Education}}{\%\text{ of Aided/Unaided Heads/Children with a given amount of education}}$$

Co-efficient of equality can be obtained by multiplying the ratio (RPR) by 100

i.e., $0.24 \times 100 = 24.00$ Heads

$0.67 \times 100 = 67.00$ Children.

TABLE 2.19

Inequality of Education among Parents and their Children (All levels of education)

Statistical Measures	*Heads (N=122)*	*Children (N=234)*
1	*2*	*3*
Coefficient of Dispersion	1.18	0.667
Variance of Education (Anti-log)	2.021	1.201
Standard Deviation of Education	0.5528	0.2826
Gini coefficient	1.180	0.375 (Graduates+under graduates)
	1.330	0.636 (Only under-graduates)
	0.438	0.187 (Only graduates)

TABLE 2.20

Cumulative Share of Respondents' Parents, Respondents' Brothers and Sisters and Respondents Themselves in Education

Share of Lowest (%)	*Respondents' Parents (N=113)*	*Respondents' Brothers and Sisters (N=234)*	*Respondents (All graduates) (N=233)*
1	*2*	*3*	*4*
10	2.73	5.82	8.80
20	7.43	13.90	17.97
30	13.92	21.87	26.90
40	21.35	31.70	36.28
50	30.91	42.27	45.66
60	42.18	52.83	56.07
70	53.71	63.89	66.04
80	67.29	76.16	76.59
90	83.00	87.47	87.79
100	100.00	100.00	100.00

NOTES AND REFERENCES

1. For the purpose of subsidising higher education of B.C. students, as per Gujarat Government G.R. dated 12-6-1980, the scheme that is currently in vogue is as follows :

Income	*Nature of Aid*
A. Monthly income of Rs. 500 from all sources	Full maintenance Full Freeship and Full Tuition fee
B. Rs. 550 to Rs. 750	One-half maintenance and full Tuition fee
C. Rs. 750 and above	No help
D. Full time-employed students	No help
E. If awarded stipend or help from any other organisation	No help
F. Trainees in social welfare department	No help
G. If after S.S.C., two or more children of the same parents studying in a college	No help
H. Girls whose parents' income exceeds the limit	Full Freeship Full Tuition fee
I. If third child is a girl	Full Freeship, fee, etc.
J. In case of drop-out	Money to be returned.

2. For E.B.C. students, the government has revised upward the income limit from time to time for the award of freeship. The said revision has been as follows:
From Rs. 900 in the beginning to Rs. 3600 at present.
3. Socially these four categories of students can be grouped into SC/ST and Non-SC/ST (E.B.C., Aided and Unaided students). Economically they can be given 'economic status' depending on their parents' income. In our sample, more than four-fifth and nine-tenth of E.B.C. and B.C. students' parents belong to the income group Rs. 5001/- and below annually. They are conferred 'low' economic status. Fifty per cent of aided students' parents belong to the income group Rs. 5000/- and below; 38 per cent belong to the next higher income group, Rs. 5,000/- to Rs. 10,000 and the remaining 12 per cent belong to the higher income group Rs. 10,000 and above. They can be accorded 'middle' economic status. Unlike this, unaided students' parents belonging to the income group Rs. 5000/- and below account for around one-fifth (20%) of the total whereas more than one-third (35%) and four-fifth (45%) belong to the income groups, Rs. 5001 to Rs. 10,000 and Rs. 10,001 and above respectively. They definitely enjoy 'high' economic status.
Our respondents were specifically asked to supply information about the income of their families when they were studying. On average, nearly 41 per cent of respondents belong to the income group Rs. 5000 and

below, 32 per cent of them belonged to the income group Rs. 5001 to Rs. 10,000 and 27 per cent to the income group Rs. 10,001 and above. These percentages for Baroda University students tally with those of 39, 35 and 26 respectively obtained for the Gujarat University.

4. "Equality of opportunity (educational) is defined as a situation in which low parental wealth and other supply disadvantages were sufficiently off-set so that the effective supply curve of funds was the same to every one . . . . To make investment in human capital a free good through subsidies from public/private agencies, all SS would lie along the horizontal axis . . . . The elimination of unequal supply conditions would reduce/increase the inequality in investments unless supply and demand conditions had been sufficiently negatively/positively related, i.e., reduce the investment and earnings of persons with favourable demand conditions *vis-a-vis* that of persons with unfavourable demand conditions." G.S. Becker and B.R. Chiswick in "Education and the Distribution of Earnings", *American Economic Review*, Vol. LVI, No. 2, May 1966.
5. H.N. Pandit: "Cost-Benefit Analysis of Indian Education", Paper presented at the seminar on Higher Education and Development organised by the Association of Indian Universities (23-25 March, 1975).
6. Over the decade of 1960s, per pupil aid to SC/ST students has doubled from Rs. 401 in 1961-62 to Rs. 808 in 1969-70, whereas it has gone up by a little over one-third, from Rs. 102 in 1961-62 to Rs. 139 in 1969-70, with respect to non-SC/ST students of the M.S. University of Baroda. Thus, average aid to B.C. students has been 4 to 6 times the average aid to non-B.C. students.

   Source : Compiled from the table "Scholarships, stipends, other financial assistance and freestudentships awarded to All Students and Backward Communities (B.C.) students" given in "Statistics for Colleges in India" available with the M.S. University of Baroda).
7. Relative Participation Rate (RPR) or 'Coefficient of Equality' (a measure introduced by J.P. Naik) at the higher level of education is influenced by what happens to this rate/coefficient at lower levels of education. This is because the *flow* of students at the next higher level of education depends on the stock at the immediate lower level. Should this be so, the improvement in the rate/coefficient at the higher level of education, as our analysis has shown, could be the consequence of the similar improvement at lower levels of education. The coefficients of equality for the Scheduled Castes and Scheduled Tribes in Gujarat between 1961 and 1966 by levels of education given in the book *Who goes to College* ? by Vimal Shah and Tara Patel show that they have improved both for elementary and secondary schools. Moreover, it is a known fact that in Gujarat, Scheduled Castes/Tribes population has been performing well in regard to literacy, enrolment, urbanisation *vis-a-vis* non-SC/ST population compared to other States and India as a whole. (See V.N. Kothari, *A Study of Economic Profiles of the Scheduled Castes in Gujarat*, M.S. University of Baroda, Baroda, 1975).
8. According to the Censuses of 1961 and 1971, the proportion of working

population in urban areas without any formal schooling has declined between 1961 and 1971, whereas that of with formal schooling has increased. The noteworthy increase is at the higher education level (India) where the said proportion has doubled from 2.41 per cent in 1971. In Gujarat, the comparable proportion has moved up from 1.38 per cent in 1961 to 3.69 per cent in 1971—an increase of roughly three times.

Similarly, the classification of workers in urban India and Gujarat by broad age-groups. though not strictly comparable, reveals that the proportion of younger workers, belonging to the age-group 15-34 (1961 Census) and 15-39 (1971 Census) has gone up. This means proportionately more younger persons with more years of schooling constituted the Indian labour force in urban areas in 1971. If this trend has persisted during 1970's, the 1981 Census would show a further increase.

3

Human Capital And Earnings

THIS chapter deals at length with the fundamental issue of the determinants of earnings in the framework of the human capital theory. Thus, it examines the hypotheses numbering four to nine indicated in Chapter 1.

We have nine and twelve variables included in our two models given below (Section I). The nine variables are present earnings (dependent variable), present age, education, occupational rank, experience, quality of education, post-school investment, starting earning and nature of employment. To these, we have added three more variables in terms of "family background"—(i) parents' earnings; (ii) parents' education; and (iii) parents' occupational rank. This, then, is the extended human capital earnings function, both linear and log-linear.

The earnings functions for various categories of respondents, for their parents, for their brothers and sisters and for *all* persons have been constructed which form the second section of this chapter. The third section comprises conclusions.

I

REGRESSION MODELS

We present below two linear models.

Model 1—Linear

Respondents' earnings = F (Age, education, occupational rank, experience, quality of schooling, post-school investment,

family background, starting salary and nature of employment).

Dummy Variables

(1) Quality of schooling.
(2) Post-school Investment.

The Model

$$Y_t = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_5 + b_6x_6 + b_7x_7 + b_8x_8 + b_9x_9 + b_{10}x_{10} + b_{11}x_{11}$$

Where,

Y_t = earnings of respondents in the given year.
a = constant term.
b_i = coefficients (i = 1, 2, 3 .....11)
x_i = variables listed above.
x_1 = Age of the respondent.
x_2 = Education in number of years of schooling.
x_3 = Occupational Rank.
x_4 = Experience.
x_5 = Quality of schooling.
x_6 = Earnings of the parents of the respondents.
x_7 = Education of the parents of respondents.
x_8 = Occupational Rank of the parents of the respondents.
x_9 = Post-school Investment.
x_{10} = Starting salary.
x_{11} = Narure of employment.
t = 1961, 1965, 1970 and 1975.

Model 2—Semi-log Linear

All the variables are the same as in linear model.

$$\text{Log } Y_t = a + b_1x_1 + b_2\log x_2 + b_3x_3 + b_4\log x_4 + b_5x_5 + b_6x_6 + b_7x_7 + b_8x_8 + b_9x_9 + b_{10}\log x_{10} + b_{11}x_{11}$$

For purposes of regression analysis the respondents are grouped into:

(a) 1961, 1965, 1970 and 1975 graduates.
(b) B.C., E.B.C., Aided and Unaided graduates,
(c) Brothers and sisters, and
(d) Parents.

The regression results are provided for each group. As stated earlier we have followed step-wise multiple regression—one model with semi-log linear and the other with normal regression.

Since we have step-w se regression the correlation is first discussed, then the regression equation itself and finally the earning profiles generated by the equation and the significance of such an analysis in terms of the proximate and influential determinants and the coefficient of determination (R^2).

II

DETERMINANTS OF EARNINGS

We have earlier in our analysis adverted to education as a determinant of earnings as well as the impact of human capital variables on earnings. It has already been established by scholars that these variables have a positive effect on earnings. The following analysis of our data substantiate such a relationship between education and earnings.

We have regressed the log of present earnings on education.

log (present earning) = f (education) — N = 231

$$\ln Y_i = 7.13008 + 0.128668x_1$$
$$(23.3410)^* \quad (7.15032)^*$$

$R^2 = 0.182$; DW = 1.67602; Standard error = 0.017995

Note:— x_1 = Education.
Figures in parentheses are t-values
*Significant at 1 % level.

It is evident that approximately the incremental effect of education on the log of present earnings is positive and significant. The low R^2 shows about more than 18 per cent variation in earnings explained by education. However, the correlation is reliable in view of N = 231. DW and Standard error and t-value are all supporting this evidence.

From this we proceed to present the effect of other human capital variables for the same N = 231. The variables are: education, experience, quality of education, post-school investment and nature of employment.

$$\ln Y_t = 8.06161 + \underset{(0.606)}{0.0171663x_1} + \underset{(7.71893)^*}{0.0385205x_2}$$
$$+ \underset{(3.90815)^*}{0.150034x_3} - \underset{(-0.8748)}{0.0199918x_4} + \underset{(2.56535)^*}{0.35795x_5}$$
$$R^2 = 0.385 \quad DW = 1.90996$$

Note : Figures in parentheses are t-values.
*Significant at 1% level.

Where,

$\ln Y_t$ = log present earnings.
x_1 = Education
x_2 = Experience
x_3 = Quality of education
x_4 = Post-school investment
x_5 = Nature of employment.

The equation is clearly more interesting than the previous one. The R^2 substantially improves to 0.385. The t-values for experience, quality of education and nature of employment are highly significant. Except for post-school investment, all the variables have come with a positive sign and even the interceptor increases, indicating the rise in the general level of minimum earnings.

Apart from human capital variables noted above, the human capital earnings function, as is made clear, incorporates other related variables like age, occupation, family background and starting earning. We give below the step-wise linear regression consisting of eleven independent variables.

$$Y_t = 5120.7 + \underset{(0.312)^*}{33.458x_1} - \underset{(-2.47)^*}{908.0x_2} + \underset{(4.41)^*}{527.02s_3}$$
$$+ \underset{(4.37)^*}{473.17x_4} + \underset{(3.24)^*}{1503.2x_5} \underset{(-0.195)}{0.0072601x_6} - \underset{(-0.726)}{73.271x_7}$$
$$+ \underset{(0.955)}{160.5x_8} + \underset{(1.27)}{413.41x_9} + \underset{(7.35)^*}{0.95105x_{10}} + \underset{(3.61)^*}{5839.1x_{11}}$$
$$R^2 = 0.565$$

Note : Figures in parentheses are t-values.
*Significant at 1% level.

It is heartening to note that R^2 gets further improved to 0.565. The t-values of human capital variables remain significant. Of the new variables introduced t-values of occupational rank (x_3) and starting earning (x_{10}) appear to be significant whereas those of

family background comprising three variables, namely, parents' earning (x_6), parents' education (x_7) and parents' occupation (x_8), do not seem to be significant. The fact that experience in relation to age is statistically significant is a clear evidence of the relative importance of experience in earnings profiles. A more or less similar picture obtains when step-wise regressions are run separately for various categories of graduates.

A step-wise linear multiple regression has also been run where N = 571 comprising respondents (all graduate), their brothers and sisters and parents (graduates + under-graduates), taking four common independent variables, viz., age, education, occupational rank and experience.

$$Y_t = -9875.5 + \underset{(0.723)}{98.248x_1} + \underset{(5.20)^*}{800.46x_2} + \underset{(4.67)^*}{651.70x_3} + \underset{(0.954)}{131.65x_4}$$

$$R^2 = 0.194$$

Note :—Figures in parentheses are t-values
*Significant at 1% level.

A few interesting features of this equation need mention. Firstly, all the four independent variables show a positive sign and R^2 though low (0.194) improves consistently. This is to be contrasted with the previous equation where education has come with a negative sign. Secondly, variables education (x_2) and occupational rank (x_3) are statistically significant as revealed by t-values. In both the cases, standard errors are fairly low relative to regression coefficients. Even age was significant till experience was introduced in the equation. In the final equation, both age and experience do not seem to be significant.

And finally, the higher the value of coefficient of variation of education, the higher is the coefficient of variation of earnings. The two coefficients are 0.269 and 0.857 respectively. In contrast, for all graduates only the respective coefficients are 0.106 and 0.582. The explanation lies in higher mean education of 16.8 years with reference to graduates than that of 14.5 years with respect to *all persons*. This implies that with the improvement in mean education schooling, inequality reduces and with that earnings inequality.

This finding is to be viewed in the context of a rising share of income from employment than from property or wealth

in the national income. It is gratifying to note that this large share of earned income is being distributed less unequally unlike the distribution of unearned income. The extraneous factors that could be accounted for such a trend, as will be borne out by our analysis, are the growth of white collar jobs, and the changing age structure of the labour force alongwith the improvement in educational opportunities.

Brothers and Sisters $N = 34$

The data regarding brothers and sisters were provided in the replies by the respondents. In all there were 233 observations. Given the heterogeneity of data in the sense that they related to various ages, educational background, diverse occupations, experience, etc., direct regression would not yield meaningful results. We have, therefore, classified the data on the basis of frequency distribution relating to income range and accordingly age, education, occupational rank and experience have been related. Consequently, the 233 observations are summed up as follows: $N = 34$ and independent variables four. We have four regression equations for the above data, linear log for unweighted data and linear log with weighted data. We present below the equations (unweighted equations—1 and 2).

Equation 1 :

$$Y_t = -20838.649 + \underset{(3.149)^*}{1310.6537x_1} \quad \underset{(-2.6332)^*}{1057.6711x_4}$$

$$R^2 = 0.398$$

*Significant at 1% level.

Where,

x_1—Age; x_4— Experience.

Equation 2:

$$\log Y_t = 5.04072 + \underset{(3.669)^*}{0.158981x_1} + \underset{(01.6268)}{0.066746x_3} - \underset{(-3.317)^*}{0.13738x_4}$$

$$R^2 = 0.458$$

*Significant at 1% level.

Where,

x_1 — Age; x_3 — Occupational Rank; x_4 — Experience.

Equation 3 :

$$Y_t = -22260.082 + 1246.6572x_1 - 61.950x_2 + 554.466x_3 - 1029.439x_4$$
$$(1\ 353) \quad (-0.0669) \quad (1.33) \quad (-1.10)$$
$$R^2 = 0.395$$

Where,

x_1 — Age; x_2 — Education; x_3 — Occupational Rank; x_4 — Experience.

Equation

$$\log Y_t = 4.8278689 + 0.19678x_1 - 0.04283x_2 + 0.07136x_3 - 0.1763x_4$$
$$(0.0207) \quad (-0.449) \quad (1.666) \quad (-1.830)$$
$$R^2 = 0.444$$

Where,

X_1 — Age; X_2 — Education; X_3 — Occupational Rank; X_4 — Experience.

Since we have run step-wise regressions, the variables which are not significant get dropped out. Therefore, the two independent variables, age and experience, significant at 1 per cent level get included (equation 1). In the equation with log (equation 2) of the variables, age, occupational rank and experience are included. They are all significant at 1 per cent level. The R^2 is 0.398 for linear and 0.458 for log. Therefore, it is noteworthy that in the case of brothers and sisters education enters only indirectly, influencing their earnings. However, we must add that when weighted, regression results show more or less the same results except that the values of R^2 are marginally reduced and the variables with logs show the importance of education also.

Respondents' Parents $N = 95$

We have regressed the present earnings of respondents' parents on their age, education, occupational rank, experience and starting earnings. We have taken those parents who were earning at the time of canvassing the schedule. We have grouped the data and dropped some extreme observations. Parents are to be distinguished from their children. Unlike their children, their mean education is 10.5 years whereas mean age is 56 years and mean experience is 36 years. Thus, they have almost completed their productive life and

are on the verge of retirement. No further investment in human capital is called for. Possibly, it has already depreciated.

The final (step-wise) regression equation is as follows :

$$Y_t = -16426.301 + 132.947x_1 + 1255.482x_2$$
$$(0.728) \quad (6.553)^*$$
$$+ 509.575x_3 - 1.602x_4 + 2.513x_5$$
$$(1.356) \quad (-0.009) \quad (6.316)^*$$

Note :—Figures in parentheses are t-values.
*Significant at 1% level.

Some of the salient features of the equation are worth reporting at this juncture. Firstly, it is characterised by good R^2, explaining 60 per cent of the variations in earnings. Secondly, except experience, regression co-efficients of the rest of the variables have a positive sign. And thirdly, variables like education, starting earnings and occupational rank have high t-values. Age and experience do not figure importantly at all in the final equation. However, with the introduction of age as a variable, the intercepter improves considerably, showing the rise in the general level of minimum earnings. With the introduction of experience, on the contrary, the intercepter stabilises and hardly shows any improvement.

Linear Step-Wise Regressions

B.C., E.B.C., AIDED AND UNAIDED

Graduates : — 9 Variables; t = 1979

B.C. Graduates $N = 17$

Beginning with the B.C. graduates we have the following equation with 9 variables and 17 observations. The final regression equation of all the variables is :

$$Y_t = 22663 - 223.33x_1 - 1035.2x_2 + 656.02x_3\ 423.40x_4$$
$$(-0.767) \quad (1.506) \quad (5.207) \quad (1.392)$$
$$+ 116.78x_5 + 590.74x_6 + 0.2977x_7 + 1093.4x_8$$
$$(0.158) \quad (1.016) \quad (1.531) \quad (0.15.1)$$

The correlation matrix shows X_3, namely occupational rank, with $R = 0.707$ followed by X_7 — starting earning with $R=0.491$. However, the R^2 actually improves as the number of variables is

increased; for all variables, $R^2=0.826$. In fact this is what encourages us to consider all the variables, although the t-value of only occupational rank is significant at 1 per cent level. With $R^2 = 0.826$ these variables explain 82.6 per cent of the variables in the earning, i.e., about 17.4 per cent of the variations in the earning remain unexplained.

Since the number of observations is 17 in the group, the t-values should be considered as indicative of the most influential variable and on those equations we have worked out the earning profiles in the next chapter.

Since occupational rank is given on the basis of schooling of persons in various occupations, education and occupational rank should turn out to be highly corrected. In fact it is not the occupational rank, but education and nature of employment that are highly related with $R=0.848$. When earnings are regressed on this variable, $R^2 = 0.664$ and t-value is significant at 1 per cent level and its significance is retained till earnings are regressed on four variables step by step.

E.B.C. Graduates N=24

The final step-wise regression consisting of all variables is :

$$\begin{aligned} Y_t = 19273 &+ 531.53x_1 - 2527.1x_2 + 955.27x_3 - 71.334x_4 \\ &\quad (0.809) \quad (-0.964) \quad (2\,168)^{**} \quad (-0.108) \\ &+ 556.19x_5 - 10.533x_6 + 0.83200x_7 + 6920.8x_8 \\ &\quad (0.307) \quad (-0.009) \quad (1.5000) \quad (0.503) \end{aligned}$$

Note : **Significant at 5% level.

The variables occupational rank $R=8.683$, followed by age with $R=0.598$ and experience with $R=558$, once again turn out to be significant, t-value being significant at 5 per cent level which was in fact significant at 1 per cent level till five variables at a time were regressed on earnings. However, R^2 has been consistently improving and in the final regression it has been 0.426, i.e., it explains about 43 per cent of the earning variations.

Education is highly correlated with (a) occupational rank ($R = 0.548$), (b) Post-school investment ($R = 0.639$) and (c) Nature of employment (with $R=0.912$) as shown by the correlation matrix.

Aided Graduates N=88

Unlike the previous two categories of graduates, with respect to aided graduates, a number of variables turn out to be significant.

The final regression equation produced below shows this :

$$Y_i = 2830.1 + 147.60x_1 - 1186.5x_2 + 370.38x_3 + 535.55x_4 + 2997.7x_5 + 796.57x_8 + 1.0041x_7 + 7588x_6$$
$$(1.199) \quad (-2.575)^* \quad (2.066)^{**} \quad (3.531) \quad (3.068)^* \quad (1.622) \quad (3.716)^* \quad (3.578)^*$$

Note : Figures in parentheses are t-values.
*Significant at 1% level.
**Significant at 5% level.

The variables education, experience, quality of education, starting earning and nature of employment are significant at 1 per cent level of significance revealed by their respective t-values; whereas occupational rank is significant at 5 per cent level, R^2 has improved step by step and finally it has turned out to be = 0.413, explaining 41 of earnings differentials.

The correlation matrix shows the variable nature of employment with the highest R = 0.545 followed by experience with R = 0.495, age with R = 0.482. Education and earnings are negatively related whereas all others are positively related. Education and occupational rank and education and nature of employment between themselves are highly correlated with R = 0.495 and R = 0.545 respectively.

Unaided Graduates N=101

The step-wise regression equation with all 9 variables, and with their t-values and significance levels in parentheses is presented below :

$$Y_i = 12900 - 364.07x_1 - 608.62x_2 + 665.49x_3 + 731.09x_4 + 1096.5x_5 - 20.829x_6 + 0.82346x_7 + 5758.0x_8$$
$$(-1.377) \quad (-0.908) \quad (3.053)^* \quad (2.845)^* \quad (1.378) \quad (-0.0031) \quad (4.103)^* \quad (1.828)^{**}$$

Note : Figures in parentheses are t-values.
*Significant at 1% level.
**Significant at 5% level.

Variables occupational rank, experience and starting earnings are significant at 1 per cent level, whereas the variable occupational rank is significant at 5 per cent level. R^2 has been gradually improving and finally settled at = 0.262, i.e., explaining ¼ of the earnings variations. The correlation matrix shows R=0.525 for the occupational rank, R=0.466 for education and R=0.438 and 0.436 for experience and nature of employment respectively.

Again, education and earnings are negatively related. But education and nature of employment and occuptional rank with $R = 0.541$ and $R = 0.804$ respectively show good correlation.

The point of interest in this is that $R^2 = 0.826$ for B.C. graduates and $R^2 = 0.426$ for E.B.C. graduates are higher than those for aided and unaided graduates. The first two categories have been singled out for subsidy with the idea of bringing them to the economic level of the other two categories of graduates.

Graduates of Four Bench-mark Years : —

9 Variables; t=1977

1961 Graduates N=31

The final step-wise regression equation for 1961 graduates is presented below :

$$Y_t = 34325 - 93.169x_1 - 3042.7x_2 + 1025.6x_3 + 521.69x_4 + 1472.8x_5 + 323.23x_6 + 1.6805x_7 + 12483x_8$$
$$(-0.276) \quad (-2.635)^* \quad (2.084)^{**} \quad (1.372) \quad (0.892) \quad (-0.294) \quad (3.715)^* \quad (2.549)^*$$

Note : Figures in parentheses are t-values.

*Significant at 1% level.

**Significant at 5% level.

Variables significant at 1 per cent level of significance are education, starting earnings and nature of employment; on the other hand occupational rank is significant at 5 per cent level. The correlation matrix shows that starting earnings with $R=0.579$ is highly correlated with the present earnings. R^2 has been consistently improving and finally explains 39 per cent of the earnings differentials. Education appears to be highly correlated with occupational rank with R 0.660 and nature of employment with $R=0.812$.

1965 Graduates N=35

The final regression equation for 1965 graduates, given below, reveals the importance of three independent variables out of eight. They are, in order of importance, nature of employment (x_8), education (x_2) and occupational rank (x_3). The first two are significant at 1 per cent level and the last at 5 per cent level. The interceptor improves substantially with the introduction of both education and

occupational rank, though of the two variables education appears with a negative sign. With the introduction of other variables—age, experience, quality of education and starting earnings—the interceptor falls and rises again when post-school investment is finally entered. $R^2=0.597$ explains around 60 per cent of the variation in earnings.

$$Y_i = 18508.164 + 1129.524x_1 - 4292.469x_2 + 952.142x_4 - 553.145x_4 + 1375.354x_5 + 673.264x_6 + 0.416x_7 + 20139.820x_8$$

(1.560) (−3.434)* (1.952)** (−0.755) (0.809) (0.471) (0.548) (4.190)*

Note : Figures in parentheses are t-values.
*Significant at 1% level.
**Significant at 5% level.

1970 Graduates N=53

The step-wise linear regression with 7 independent variables for 1970 graduates gives $R^2=0.338$, explaining 34 per cent of the earnings differentials. The significant variables are occupational rank, quality of education and starting earnings—the level of significance being 1 per cent. Age has come here with a negative sign whereas education and experience have come with a positive sign.

$$Y_i = 5399.4 - 134.32x_1 + 227.32x_2 + 402.46x_3 + 203.78x_4 + 1177.8x_5 + 0.7391x_6 - 503.99x_7$$

(−0.766) (0.277) (2.79)* (1.14) (1.95)* (1.70)* (−0.104)

Note : Figures in parentheses are t-values
*significant at 1% level.

1975 Graduates N=114

The 1975 graduates constitute the latest group in our study numbering about 114. Since the number of observations is very large, the correlation coefficient value is much less important yet occupational rank, starting earnings and nature of employment have high correlation coefficient values than others, while occupational rank, experience, post-school investment and starting earning have t-values which are significant at 1 per cent or 5 per cent level. Even otherwise, there is a very important observation here, namely, the value of R^2 which increases with the

addition of every variable. However, R^2 does not improve after the introduction of education and especially with introduction of age. (We may refer to Mincer who asserts that at a particular stage age-education interaction is eclipsed by experience). Similarly, post-school investment which hardly figures in other equations, comes out with a t-value which is significantly different from that at 1 per cent level. Perhaps one could adduce several reasons why post-school investment is significant here but not elsewhere. Diversification of education, specialization programme of training, employer interests and their availability and accessibility may have improved in recent years, and are exploited by the new graduates.

Unemployment among graduates might not have forced them into accepting relatively low salary jobs. Hence, the importance of starting earnings.

$$Y_i = 1330.7 + 3.766x_1 - 376.91x_2 + 381.79x_3 + 164.62x_4$$
$$\quad (0.038) \quad (-0.775) \quad (3.186)^* \quad (1.625)$$
$$+ 63.88x_5 + 1041.6x_6 + 1.0498x_7 \quad 3822.2x_8$$
$$(1.687)^{**} \quad (3.325)^* \quad (7.919)^* \quad (1.483)$$

Note :Figures in parentheses are t-values.

*Significant at 1% level.

**Significant at 5% level.

It should be noted, however, that the number of observations relates to one group of respondents, namely, graduates. Therefore the degree of variation in education measured in terms of number of years of schooling is extremely small and if anything the variations from the mean downwards are much more than variations upward. The obvious result is that education as a whole has a depressing effect on earnings in this group while elsewhere it may not be so.

We have already observed the improvement in the R^2 with the increase in the number of variables. It is 0.355 or nearly 0.38 with or without age. Therefore within the limitation of these data, variations in earnings are explained to the extent of 36 per cent. This of course leaves 64 per cent unexplained variation. What we notice, however, in step-wise regression is that education does influence earnings, though marginally. On the basis of regression analysis, we can make a comparison of these four groups of graduates—B.C., E.B.C. Aided and Unaided.

Occupational rank is a significant factor while nature of

employment itself has no influence on earnings. A remarkable feature is that these variables account for more than 82 per cent of variations in earnings of B.C. while all this is true in the case of E.B.C. graduates also, all these variables put together explain 42.6 per cent variation in earnings.

Aided and unaided graduates present a different picture. Variables which occupy position of high significance are education, experience, quality of education, alongwith occupational rank in the case of aided graduates whereas in the case of unaided graduates significant variables are occupational rank, experience, education and nature of employment. Again these variables together explain 34 per cent and 36 per cent of variation in earnings respectively of aided and unaided graduates.

Thus, we may conclude on a most remarkable point, namely, human capital variables explain the earning variation of backward community graduates. Hence we can state that the government finances are going to increase the education of the backward community. Students should make a dent in course of time on existing disparities.

B.C., E.B.C., Aided and Unaided Graduates :—

12 Variables; t=1979

B.C. Graduates N=17

This is essentially an extension of what we have done. The three additional variables relate to family background, namely, parents' earnings, education and occupational rank. In the correlation matrix the respondents' occupational rank shows the highest correlation coefficient (R) followed by starting earnings, experience and parents' earnings. The equation of earnings combining all 12 variables is as follows :

$$Y_t = 22244 - 154.41x_1 - 1311.4x_2 + 596.57x_3 + 308.05x_4$$
$$(-0.358) \quad (-1.594) \quad (+2.593)^{**} \quad (0.775)$$
$$+ 279.81x_5 + 0.24389x_6 - 178.52x_7 - 23.402x_8$$
$$(0.218) \quad (0.659) \quad (-0.966) \quad (-0.093)$$
$$+ 410.86x_9 + 0.44098x_{10} + 3734.9x_{11}$$
$$(0.498) \quad (1.326) \quad (0.389)$$

**Significant at 5% level.

In this last equation with the introduction of age only occu-

pational rank has a t-value which is significant at 5 per cent level. Obviously four variables which come out with significant t-values are occupational rank, nature of employment. parents' occupational rank, education of the respondent, and post-school investment.

In the regression model we considered the family background especially in the case of B.C. as an important determinant. Both education and family background have proved the hypothesis. However, the occupational rank which itself is determined by education seems to be significant here as well as in the model with 9 variables.

The $R^2 = 0.872$ behaves in the same manner. Even in the change of coefficient of determination, it is the occupational rank which has the prime of place. However, R^2 continuously improves with the introduction of new variables. Together, the variables explain 87.2 per cent variation in earnings.

However, it should be noticed that age, education, parents' occupational rank show depressing effects on earnings. As we shall see later on, in the life-time earning profile the results follow expected pattern.

Aided Graduates N=76

The results of the aided graduates are highly interesting in more sense than one. The coefficient of correlation shows the highest value is that of the nature of employment followed by experience, occupational rank, age, quality of education and starting earnings. Family background and post-school investment do not seem to matter. The following is the equation with 12 variables:

$$\begin{aligned} Y_t = 17840 &- \underset{(-0.112)}{16.124x_1} - \underset{(-3.526)^*}{2212.9x_2} + \underset{(2.046)^{**}}{379.58x_3} + \underset{(3.770)^*}{645.35x_4} \\ &+ \underset{(2.897)}{2134.4x_5} - \underset{(-1.807)}{0.17564x_6} - \underset{(-0.233)}{41.407x_7} + \underset{(0.501)}{141.14x_8} \\ &+ \underset{(1.496)}{833.01x_9} + \underset{(2.012)^*}{0.75261x_{10}} + \underset{(4.873)^*}{14255x_{11}} \end{aligned}$$

Note: Figures in parentheses are t-values.
*Significant at 1% level.
**Significant at 5% level.

Seven out of the 12 variables have t-values which are significantly different from zero. And out of these 7, 5 are significant at 1 per cent level and two are at 5 per cent level. Age, education,

family background have a depressing effect on total earnings. The R^2 improves with the addition of every variable. However, post-school investment, parents' occupational rank, parents' education and respondents' age have virtually no effect on R^2. In other words, 47.67 per cent of the variations in earnings are explained by the remaining human capital variables. These variables put together leave more than 50 per cent variation in earning unexplained.

Unaided Graduates N=101

In the case of unaided graduates, the sample itself reaches a higher degree of respectability with such a large number of observations (N = 101). Six of the 11 human capital determinants show high degree of correlation with earnings, occupation, education, experience, nature of employment, starting earnings and age. Family background, quality of education, post-school investment hardly seem to matter.

$$Y_t = 10174 - 361.37x_1 - 498.97x_2 + 652.52x_3$$
$$(-1.331) \quad (-0.698) \quad (2.952)^*$$
$$+ 708.98x_4 + 1121.1x_5 + 0.00027x_6 - 116.94x_7$$
$$(2.708)^* \quad (1.360) \quad (0.005) \quad (0.653)$$
$$+ 375.62x_8 - 91.195x_9 + 0.82666x_{10} + 5175.6x_{11}$$
$$(1.307) \quad (-0.152) \quad (4.045)^* \quad (1.762)^{**}$$

Note : Figures in parentheses are t-values
*Significant at 1% level.
**Significant at 5% level.

Occupational rank, starting earnings and experience have t-values which are significantly different from zero at 1% level. Nature of employment is at 5% level. This is more or less consistent throughout the different equations with different variables introduced. Age, education, parental education and post-school investment have depressing effects on earnings. Parental education, post-school investment and parental earnings have scant effect on earnings variations. The remaining eight variables explain 27.2 per cent of the variations in earnings.

Graduates of Four Bench-Mark Years :—

12 Variables, t = 1979

1965 Graduates N=29

With 12 variables we have the other group of graduates year-wise for our bench-mark years whose data are analysed. The

correlation matrix shows good correlation for six out of eleven variables—age, experience, parents' earnings, quality of education, nature of employment and occupational rank in that order.

$$Y_t = -58594 + 2869.5x_1 - 3414.5x_2 + 844.85x_3$$
$$(2.144)^{**} \quad (-1.455)^{**} \quad (0.950)$$
$$+ 55.43x_4 - 2482.8x_5 + 0.43742x_6 + 177.79x_7$$
$$(0.040) \quad (0.861)^{**} \quad (2.280)^{**} \quad (0.271)$$
$$-183765x_8 - 3365.9x_9 - 0.021255x_{10} + 23541x_{11}$$
$$(-1.795) \quad (-1.388)^{**} \quad (-0.019) \quad (2.644)^{*}$$

Note : Figures in parentheses are t-values.
**Significant at 5% level.
*Significant at 1% level.

The results seem to be remarkable particularly because of the general treatment of all graduates of a given year. Following the step-wise regression, with six of the human capital variables (independent) introduced, all the six have come out with t-values significantly different from zero, two of them at 1 per cent level and the remaining four at 5 per cent. In the final equation, three variables —age, parents' earnings and nature of employment—came out with significant t-value at 5 per cent level. However, variables like occupational rank, parents' education, experience and starting earnings have barely any effect on the R^2. The remaining variables together explain 62.6 per cent variation in earnings. Here again, education, parents' education, parents' occupational rank and starting earnings have depressing effects on earnings.

1970 Graduates N=45

Three variables which have turned out to be significant are occupational rank, quality of education and post-school investment —all significant at 1 per cent level. R^2 is higher at 0.489, explaining about 49 per cent of earning variations. The family background (variables 6, 7 and 8) has no relevance whatsoever.

$$Y_t = -194.90 + 107.13x_1 + 91.994x_2 + 306.33x_3$$
$$(0.632) \quad (0.0959) \quad (2.60)^{*}$$
$$-10.805x_4 + 1329.8x_5 - 0.0257x_6 - 34.977x_7$$
$$(-0.0076) \quad (2.57+^{*}) \quad (-0.521) \quad (-0.361)$$
$$-313.23x_8 + 0.689x_9 + 0.80834x_{10} - 1649.6x_{11}$$
$$(-0.373) \quad (2.61)^{*} \quad (-0.521) \quad (-0.262)$$

Note : Figures in parentheses are t-values
*Significant at 1% level.

1975 Graduates N=114

There are 114 observations and six variables have good correlation with earnings. In our inquiry 1975 is the latest year. Starting earnings have a high correlation with present earnings followed by occupational rank, nature of employment, education, age and experience.

$$Y_t = 1515.0 - 205.52x_1 - 392.47x_2 + 372.35x_3 + 158.79x_4$$
$$(-0.201) \quad (-0.792) \quad (3.047) \quad (1.560)$$
$$+ 756.69x_5 + 0.0003x_6 + 150.04x_7 - 195.91x_8$$
$$(1.664) \quad (0.098) \quad (1.599) \quad (-1.269)$$
$$+ 1154.0x_9 + 1.0486x_{10} + 4130.5x_{11}$$
$$(3.595)^* \quad (7.864)^* \quad (1.582)$$

Note : Figures in parentheses are t-values.
*Significant at 1% level.

Following step-wise regression when 5 human capital variables are introduced, all of them have t-values which are significant—4 variables at 1 per cent level and 5th one at 5 per cent level. In the final equation with all the variables they maintain their level with the exception of experience. Age, education and parents' occupational rank have negative effects on earnings. Age, education and parents' earnings do not have much effect on R^2. The remaining variables explain 37 per cent of the variation in earnings.

The relevant correlation matrices are given at the end of the present chapter (See Tables 3.1 to 3.19).

Semi-log Linear Step-wise Regressions
9 Variables—t = 1979

Semi-log linear regressions as per Model 2 for graduate respondents of four categories and bench-mark years, one with 9 variables and the other with 12 variables hardly differ in the content observed with respect to similar linear regressions (Model I).

B.C., E.B.C., Aided and Unaided Graduates

B.C. Graduates N=17

With regard to B.C. graduates, R^2 is as high as 0.831. Two variables significant at 1 per cent and 5 per cent levels of signifi-

cance are occupational rank and starting earnings respectively. Though in the final equation nature of employment does not turn out to be significant, it improves R^2 significantly as soon as it is entered. R^2 jumps from 0.224 to 0.716. Furthermore, it is significant either at 1 per cent or 5 per cent levels of significance till four variables, out of eight independent variables, are introduced. Education and nature of employment are highly correlated as revealed by correlation coefficient of 0.847. Education and earnings are negatively related, showing weak correlation, but its introduction does not depress the earnings, as R^2 slightly improves. As against this, R^2 fails to improve with the introduction of age.

$$\begin{aligned} \text{In } Y_t = 11.893 &- 0.0057902x_1 - 1.5774x_2 + 0.068675x_3 \\ &\quad (-0.188) \quad (-1.349) \quad (5.246)^* \\ &+ 0.10034x_4 + 0.022032x_5 + 0.069379x_6 \\ &\quad (0.558) \quad (0.281) \quad (1.037) \\ &+ 0.19963x_7 - 0.13291x_8 \\ &\quad (2.004) \quad (-0.140) \end{aligned}$$

*Significant at 1% level.

E.B.C. Graduates N=24

Coming to E.B.C. graduates, the final regression equation explains nearly 53 per cent of earnings differential, R^2 being=0.527. All throughout, occupational rank is the only significant variable at 1 per cent level.

$$\begin{aligned} \text{In } Y_t = 12.972 &+ 0.042602x_1 - 2.9271x_2 + 0.090095x_3 \\ &\quad (0.977) \quad (-0.925) \quad (2.655)^* \\ &- 0.022600x_4 + 0.066988x_5 - 0.013600x_6 \\ &\quad (-0.088) \quad (0.594) \quad (-0.140) \\ &+ 0.24753_7 + 0.41802x_8 \\ &\quad (1.480) \quad (0.410) \end{aligned}$$

$R = 0.726 \quad R^2 = 0.527$

*Significant at 1% level.

Aided Graduates N=88

In case of aided graduates, the explanatory power of independent variables falls further as shown by R^2 which is 0.332. R^2 improves steadily with each variable introduced. Though R^2 has fallen, of the eight independent variables, five variables have t-values significant either at 1 per cent or 5 per cent levels. The variables

are age, occupational rank (5% level of significance), experience, quality of education and starting earning (1% level of significance). Though education and earnings are positively correlated (0.477), the significant human capital variables turn out to be experience and quality of education—justifying their inclusion in the extended human capital earnings function like the present one.

$$\begin{aligned} \ln Y_t &= 6.5641 + 0.020405x_1 - 0.29392x_2 + 0.027348x_3 \\ &\qquad\quad (2.270)^{**} \quad (-0.428) \qquad (1.820)^{**} \\ &+ 0.19087x_4 + 0.17543x_5 + 0.034767x_6 \\ &\quad (2.636)^{*} \qquad (2.997)^{*} \qquad (0.856) \\ &+ 0.21099x_7 + 0.25595x_8 \\ &\quad (2.381) \qquad (1.484) \\ &\quad R^2 = 0.332 \end{aligned}$$

Note: *Significant at 1% level.
**Significant at 5% level.

Unaided Graduates N=101

With regard to 'unaided' graduates, R^2 is 0.291, explaining more than one-fourth of earnings differentials. But four variables are significant in the final equation—occupational rank, experience, starting earning (1 per cent level of significance) and quality of education (5% level of significance). Like the regression education for aided graduates, here also human capital variables other than formal education seem to be important. The significance of starting earning lies in the fact that graduates in India wait for a job till they get a better remunerated job. Waiting on their part is, thus, justified. This reflects the recruitment/promotion/hiring policies in vogue in our country as observed by M. Blaug some time back.

$$\begin{aligned} \ln Y_t &= 6.6308 - 0.016143x_1 - 0.061032x_2 + 0.050762x_3 \\ &\qquad\quad (-1.453) \quad (-0.075) \quad (3.408)^{*} \\ &+ 0.37672x_4 + 0.090706x_5 - 0.0039500x_6 \\ &\quad (4.096)^{*} \qquad (1.686)^{**} \qquad (-0.095) \\ &+ 0.25154x_7 + 0.17918x_8 \\ &\quad (3.096)^{*} \qquad (0.961) \\ &\quad R^2 = 0.291 \end{aligned}$$

Note: *Significant at 1% level.
**Significant at 5% level.

Graduates of Bench-mark Years

1961 Graduates N=31

The final step-wise regression for 1961 graduates explains roughly 47 per cent of earnings variations ($R^2 = 0.468$). The variables—experience and starting earning—are significant at 1 per cent level whereas other three variables—education, occupational rank and nature of employment—are significant at 5 per cent level. Of the two, age and experience, age depresses earnings.

$$\begin{aligned} \ln Y_t &= 12.378 - 0.0050309x_1 - 2.7798x_2 + 0.058662x_3 \\ &\qquad\quad (-0.315) \quad (-2.218)^{**} \quad (2.153)^{**} \\ &+ 0.49686x_4 + 0.080340x_5 - 0.033342x_6 \\ &\quad (2.852)^{*} \quad (0.895) \quad (-0.558) \\ &+ 0.34575x_7 + 0.60831x_8 \\ &\quad (2.553)^{*} \quad (2.251)^{**} \\ &R = 0.684 \quad R^2 = 0.468 \end{aligned}$$

Note: *Significant 1% level.
**Significant at 5% level.

1965 Graduates N=29

Even for 1965 graduates, the final equation explains earnings differentials to the extent of 48 per cent ($R^2=0.484$). Age and nature of employment are significant at 1 per cent level of significance. Education, occupational rank and quality of education variables show 5 per cent level of significance. With the entry of education and quality of education variables, R^2 shows a considerable improvement. It improves from 0.102 to 0.259 in case of quality of education. With regard to education, though poorly correlated with present earnings (correlation coefficient being 0.278), R^2 improves from 0.334 to 0.439 once education is introduced in the equation. The intercept at this stage is as high as 11.766 which was 5.403 just before its introduction.

$$\begin{aligned} \ln Y_t &= 14.168 + 0.14311x_1 - 3.2853x_2 + 0.071935x_3 \\ &\qquad\quad (3.397)^{*} \quad (-2.277)^{**} \quad (2.345)^{**} \\ &- 0.54754x_4 + 0.14379x_5 - 0.03908x_6 \\ &\quad (-1.238) \quad (1.597)^{**} \quad (-0.457) \\ &+ 0.096176x_7 + 0.83333x_8 \\ &\quad (-0.512) \quad (2.855) \\ &R^2 = 0.484 \end{aligned}$$

Note: *Significant at 1% level.
**Significant at 5% level.

1970 Graduates N=53

The semi-log linear regression equation for the 1970 graduates gives $R^2 = 0.318$ which consistently improves. The t-values of the two variables—occupational rank and quality of education—show that they are significant at 1 per cent level.

$$\begin{aligned} \ln Y_t = {} & 9.3950 - 0.0089490x_1 - 0.025610x_2 \\ & \quad (-0.553) \quad (-0.357) \\ & + 0.041396x_3 + 0.020917x_4 + 0.11419x_5 \\ & \quad (3.07)^* \quad (1.27) \quad (2.03)^* \\ & - 0.015115x_6 + 0.29776x_7 \\ & \quad (-1.16) \quad (0.727) \end{aligned}$$

Note: Figures in parentheses are t-values.
*Significant at 1% level.

1975 Graduates N = 114

Like 1970 graduates, with respect to 1975 graduates, R^2 is 0.301. All the four variables—occupational rank, experience, post-school investment and starting earning—are significant at 1 per cent level. Of the four, two are important human capital variables.

The point worth noting at this juncture is a sizeable variation in R^2 between older graduates (1961 and 1965) and younger graduates (1970 and 1975). As we shall see later, the extent of schooling and income inequalities is more with respect to the former than the latter. It is encouraging that the present earnings function explains a higher proportion of earnings variations in those who are more disparate in terms of education and income. By implication, we infer that narrowing disparities in education and other human capital variables lessens income disparities.

$$\begin{aligned} \ln Y_t = {} & 5.1612 - 0.011763x_1 - 0.27151x_2 + 0.041402x_3 \\ & \quad (-1.352) \quad (-0.319) \quad (3.209)^* \\ & + 0.18450x_4 + 0.071959x_5 + 0.11123x_6 \\ & \quad (2.895)^* \quad (1.549) \quad (3.356)^* \\ & + 0.47728x_7 + 0.28289x_8 \\ & \quad (6.548)^* \quad (1.102) \\ & R^2 = 0.301 \end{aligned}$$

Note: *Significant at 1% level.

Semi-log linear Regression Equations
12 Variables —t=1979
Aid and Unaided Graduates

Aided Graduates N=76

Of the eleven independent variables, six are statistically significant. They are age, parents' earnings, experience, starting earnings, parents education (all significant at 5 per cent level) and quality of education (significant at 1 per cent level). Of the three new variables entered, two variables, namely, parents' earnings and parents' education, though negatively correlated with earnings, seem to be relevant. The variable 'quality of education' is again very significant unlike B.C. and E.B.C. graduates. R^2 is 0.326 explaining nearly 33 per cent of the earning differentials.

$$\begin{aligned} \ln Y_t = {} & 5.8582 + \underset{(2.035)^{**}}{0.22726x_1} + \underset{(0.064)}{0.059598x_2} + \underset{(1.474)}{0.024967x_3} \\ & + \underset{(1.976)^{**}}{0.16998x_4} + \underset{(3.130)^{*}}{0.20401x_5} \underset{(-1.969)^{**}}{-0.000017} \\ & \underset{(-1.768)}{-0.028262x_7} + \underset{(1.248)}{0.032106x_8} + \underset{(1.411)}{0.070510x_9} \\ & + \underset{(1.997)}{0.20427x_{10}} + \underset{(0.064)}{0.16570x_{11}} \\ & R^2 = 0.326 \end{aligned}$$

Note: *Significant at 1% level.
**Significant at 5% level.

Unaided Graduates N=101

Around 30 per cent of earning differentials is explained by R^2 (0.296). The t-values of variables occupational rank, experience and starting earning show that they are significant at 1 per cent level. The variable quality of education is significant at 5 per cent level till last but one variable is introduced. There is a 'qualitative' difference between earning differentials on account of 'schooling' (in terms of years of formal education) and that due to 'quality of education' measured in terms of grade/class obtained at S.S.C. examination). The latter to some extent can be justified as it reveals certain 'innate abilities' (or 'native intelligence') of persons and human traits like the qualities of hard work, persuasion, [illegible]. Schooling differentials or inequalities might be the outcom[illegible]

policies whereas quality of education differences are obviously not.

One variable is introduced. The standard error for education of 0.869 exceeds that the regression coefficient of 0.16963 revealing a less importance of 'schooling' variable when all are 'graduates'. This variable is statistically also not significant and R^2 hardly improves even after its introduction.

$$\begin{aligned} \ln Y_t &= 6.0686 - 0.017019x_1 + 0.16963x_2 + 0.051713x_3 \\ &\qquad (-1.425) \qquad (0.195) \qquad (3.416)^* \\ &\quad + 0.36580x_4 + 0.091674x_5 - 0.0000009x_6 \\ &\qquad (3.863)^* \qquad (1.640)^{**} \qquad (-0.256) \\ &\quad - 0.010321x_7 + 0.0084348x_8 + 0.0037804x_9 \\ &\qquad (-0.846) \qquad (0.430) \qquad (0.095) \\ &\quad + 0.25279x_{10} + 0.14905x_{11} \\ &\qquad (3.059)^* \qquad (0.761) \\ &\quad R^2 = 0.296 \end{aligned}$$

Note: *Significant at 1% level.
**Significant at 5% level.

1965 Graduates N=29

Three more variables in the nature of parents' earning, education and occupation are added to the previous nine variables inclusive of dependent variable, namely, present earnings.

The value of R^2 being 0.555 explains as high a proportionate variation in earnings as explained by the regression equation with nine variables. The variables with significant t-values are age, occupational rank and nature of employment (all three significant at 1% level) and schooling (significant at 5% level). One more variable that deserves mention is the 'quality of education' (a dummy variable in our analysis) which is significant at 1 per cent level from its very introduction till three more variables are and is introduced significant at 5% level till two more variables are further introduced. Once the quality of education variable ceases to be statistically significant, the R^2 also virtually stops improving.

$$\begin{aligned} \ln Y_t &= 14.178 + 0.12916x_1 - 3.2446x_2 + 0.082285x_3 \\ &\qquad (2.983)^* \quad (-2.207)^{**} \quad (2.552)^* \\ &\quad - 0.49645v_4 + 0.095558x_5 + 0.0000068x_6 \\ &\qquad (-1.122) \qquad (0.951) \qquad (1.060) \\ &\quad - 0.026034x_7 + 0.8334x_8 - 0.049423x_9 \\ &\qquad (-1.177) \qquad (2.855)^* \qquad (-0.526) \end{aligned}$$

$$-0.039206x_{10} + 0.82173x_{11}$$
$$(-0.207) \quad (2.665)^*$$
$$R^2=0.555$$

Note: *Significant at 1% level.
**Significant at 5% level.

1970 Graduates N=47

The semi-log linear equation is identical in content and needs no interpretation.

$$\ln Y_t = 8.1569 + 0.0178x_1 + 0.02098x_2 + 0.028076x_3$$
$$(1.00) \quad (0.212) \quad (2.29)^*$$
$$-0.0049175x_4 + 0.12388x_5 - 0.045550x_6$$
$$(-0.295) \quad (2.46)^* \quad (-0.905)$$
$$+ 0.000012060x_7 - 0.035823x_8 + 6990.0x_9$$
$$(0.0123) \quad (-0.445) \quad (2.74)^*$$
$$+ 0.0020840x_{10} - 0.21341x_{11}$$
$$(0.152) \quad (-0.330)$$

Note: Figures in brackets are t-values.
*Significant at 1% level.

1975 Graduates N=114

The two variables which turn out to be significant for 1970 graduates, namely, occupational rank and post-school investment--are all significant at 1% level with regard to 1975 graduates. The extra variable statistically significant is experience unlike 'age' for older graduates (i.e., 1961 and 1965 graduates). This may be taken to mean that for the first decade or two of the working life, it is the 'experience' that matters in the sense that the 'quality' of the stock of human capital improves with experience, resulting in a faster rate of growth in life-time earnings. Ageing phenomenon comes in the picture later which apart from shortening the 'pay-off' period causes depreciation of human capital resulting in the deceleration of the rate of growth of life-time earnings. Earnings profiles analysed in the following chapter bear testimony to this.

$$\ln Y_t = 5.3268 - 0.011946x_1 - 0.34559x_2 + 0.039750x_3$$
$$(-1.325) \quad (-0.395) \quad (3.059)^*$$
$$+0.18357x_4 + 0.373397x_5 - 0.000002x_6$$
$$(2.832)^* \quad (1.560) \quad (0.618)$$
$$+0.0059146x_7 - 0.013746x_8 + 0.11699x_9$$
$$(0.607) \quad (-0.861) \quad (3.407)$$

$$+0.47879x_{10} + 0.31350x_{11}$$
$$(6.445) \qquad (1.197)$$
$$R_2=0.307$$

Note: *Significant at 1% level.

The relevant correlation matrices are given at the end of this chapter (see Tables 3.20 to 3.32).

III

CONCLUDING OBSERVATIONS

This chapter on 'human capital and earnings' has primarily analysed the determinants of earnings by fitting the extended human capital earnings function on the data collected from our respondents. Earnings functions are both linear and semi-log linear with 9 and 12 variables. The statistical method of step-wise regression has been followed for the purpose and the regressions were run on the computer PD 1170 (IIM, Ahmedabad) and IBM 360 at the Baroda University Computer Centre.

The main objective was to identify the determinants of earnings with a view to estimating the life-time earnings instead of relying on very crude earnings profiles for finding out private returns to investment in education. Moreover, this has helped us in testing 'schooling model' and in understanding the role of different variables like age, experience and family background in the human capital theory. The main conclusions drawn are presented below in brief.

Log earnings regressed on education, giving $R^2=0.182$, lends support to the schooling model which fails to capture the variations in earnings associated with variables other than education.

That human capital variables, including education, are important determinants of earnings can be seen when log earnings are regressed on experience, quality of education, post-school investment and nature of employment. $R^2=0.385$ has improved a great deal and variables—experience, quality of education and nature of employment—have come out significantly.

The R^2 gets further improved to 0.565 when the regression is run incorporating age, occupational rank, family background and starting earning together with the variables noted earlier. Of the new variables, occupational rank and starting earning turn out to be

statistically significant. Family background does not appear to be important. Of the two—age and experience—the latter with high t-value is significant at 1 per cent level. However, age has a positive sign and certainly influenced R_2 as variation in earnings associated with age is taken care of. All the three conclusions noted here have one thing in common in that they refer to respondents who are all graduates.

Earnings regressed on age and experience and respondents' brothers and sisters, who constitute a heterogeneous group in terms of educational attainment, give $R^2=0.395$ and both the variables show 1 per cent level of significance. R^2 improves to 0.458 when log earnings are regressed on age, experience and occupational rank. In a step-wise regression, the non-significant variables automatically get dropped out. Only in weighted equations, education finds its place. Thus, education influences earnings of brothers and sisters only indirectly.

Earnings regressed on age, education, occupational rank, experience and starting earning of respondents' parents, more distinct group than the previous two, on the contrary, give a good fit with R^2 explaining 60 per cent of variations in earnings. The important variables are education, starting earning and occupational rank all with a positive sign. The high value of R^2 owes to age as with its introduction, the interceptor improves a great deal.

With 571 observations and 4 independent variables, a step-wise regression equation reveals a positive sign for age, education, occupational rank and experience and significance of education and occupational rank.

Step-wise regression equations for B.C., E.B.C., Aided and Unaided categories of respondents reveal (a) a comparatively higher R^2 for the first three categories with the highest R^2 for the B.C. category, and (b) a difference in the importance of variables category-wise. For B.C. and E.B.C., variables occupational rank, nature of employment, education, and post-school investment appear to be signifiacant whereas for aided and unaided, education, quality of education, experience, starting earning, nature of employment and occupational rank are quite significant. The point of significance lies in the fact that the value of R^2 is high for the categories singled out for subsidy to bring them on par with better off categories of students.

Regression equations for the graduates of the four bench-mark

years, on the contrary, bring to light a new phenomenon of relatively higher R^2 for older graduates (1961 and 1965) than that for younger (1970 and 1975). This can be interpreted as high explanatory power of the earnings function when graduates are characterised by high schooling and earnings inequalities given by coefficient of variation. Furthermore, the variable post-school investment has a say in case of younger graduates.

The role of age and experience is also distinctly brought out by these equations. Age has a depressing effect on earnings. In most of the cases, experience has turned out to be significant *vis-a-vis* age supporting the theoretical importance of experience.

In this anaylsis there are two important 'groups' which emerge distinctly from one another. The homogeneous group of graduates—the cohorts—and the groups of parents and brothers and sisters and 'all' forming the second group. The cohorts have 'equal' educational attainments, therefore the education would not have any direct effect on earnings *per se*. Even then, with the other variables it comes out with a positive sign in the semi-log equations and with significant t-values.

In the case of the heterogeneous groups 'education' in conjunction with other human capital variables has a significant role in determining variations in earnings. Thus human capital variables explain significantly the earnings variations.

Thus, in brief, regression equations with 9 variables, that is, exclusive of 'family background' variables, seem appropriate for estimating life-time earnings which is the major theme of the next chapter.

TABLE 3.1

Correlation Matrix. N=231

Variables	*Persent Earning*	*Education*	*Experience*	*Quality of Education*	*Post-school Investment*	*Nature of Employment*
	$ln\ Y_i$	x_1	x_2	x_3	x_4	x_5
$ln\ Y_i$	1.0000	0.36889	0.10760	0.29297	0.82015	0.42722
x_1		1.0000	−0.15494	0.27821	0.30513	0.49866
x_2			1.0000	−0.11135	0.13399	0.18518
x_3				1.0000	0.28135	0.14263
x_4					1.0000	0.43680
x_5						1.0000

TABLE 3.2

Correlation Matrix—Respondent Graduates (All)—N=231

Variables	*Present Earnings*	*Age*	*Education*	*Occupational Rank*	*Experience*	*Quality of Education*	*Parents' Earnings*
	Y_t	x_1	x_2	x_3	x_4	x_5	x_6
Y_t	1.0000	0.46977	0.52670	0.52979	0.47649	0.19181	0.0601851
x_1		1.0000	0.48340	0.49040	0.87666	0.19310	0.10569
x_2			1.0000	0.57992	0.35712	0.10831	—0.11264
x_3				1.0000	0.39662	0.057153	—0.000304
x_4					1.0000	—0.16639	0.12271
x_5						1.0000	0.44730
x_6							1.0000
x_7							
x_8							
x_9							
x_{10}							
x_{11}							

(Contd. in width)

Table 3.2 Contd.

Variables	*Parents' Education*	*Parents' Occupational Rank*	*Post-school Investments*	*Starting Earning*	*Nature of Employment*
	x_7	x_8	x_9	x_{10}	x_{11}
Y_t	0.019151	0.02578	0.12931	0.38018	0.45678
x_1	0.043776	0.050502	0.31494	0.098850	0.35550
x_2	0.0022388	—0.10589	0.31728	0.18753	0.82025
x_3	0.028670	0.012149	0.15826	0.18207	0.46915
x_4	0.045860	0.57140	0.29949	0.15046	0.25629
x_5	—0.038052	0.070159	—0.10420	0.21019	0.17791
x_6	0.40350	0.41218	0.026017	0.051670	0.15445
x_7	1.0000	0.78630	0.12185	0.043752	—0.083532
x_8		1.0000	0.087307	0.012137	—0.14283
x_9			1.0000	0.25636	0.25111
x_{10}				1.0000	0.19538
x_{11}					1.0000

Note: Variables: Y_t—Present earning; x_1—Age; x_2—Education; x_3—Occupational Rank; x_4—Experience; x_5—Quality of Education; x_6—Parents' earnings; x_7—Parents' education; x_8—Parents' occupational Rank; x_9—Post-school investment; x_{10}—Starting earnings; x_{11}—Nature of employment.

TABLE 3.3
Correlation Matrix, N=571

Variables	*Present earnings*	*Age*	*Education*	*Occupational Rank*	*Experience*
	$ln\ Y_t$	x_1	x_2	x_3	x_4
$ln\ Y_t$	1.0000	0.18762	0.25087	0.34749	0.12674
x_1		1.0000	—0.40250	0.080006	0.96413
x_2			1.0000	0.43402	—0.54539
x_3				1.0000	—0.011165
x_4					1.0000

TABLE 3.4
Correlation Matrix: Brothers and Sisters—N=34

Variables	*Present earnings*	*Age*	*Education*	*Occupational Rank*	*Experience*	*Log earnings*
	Y_t	x_1	x_2	x_3	x_4	$log\ y_t$
Y_t	1.0000	0.3106	0.3897	0.991	0.555	0.5009
x_1		1.0000	0.0898	—0.420	0.1464	0.23709
x_2			1.0000	0.3679	0.4336	0.4499
x_3				1.0000	0.5037	0.4360
x_4					1.0000	0.966
$log\ Y_t$						1.0000

TABLE 3.5

Correlation Matrix: Parents—N=95

Variables	*Present earnings*	*Age*	*Education*	*Occupatinnal Road*	*Experience*	*Starting earnings*
	Y_t	x_1	x_2	x_3	x_4	x_5
Y_t	1.0000	—0.007	0.640	0.345	0.127	0.502
x_1		1.000	0.183	—0.160	0.932	—0.109
x_2			1.000	0.515	0.321	0.163
x_3				1.000	0.360	0.065
x_4					1.000	0.132
x_5						1.000

TABLE 3.6

Correlation Matrix (Linear): B.C. Graduates—N=17

Variables	*Present earnings*	*Age*	*Education*	*Occupational Rank*	*Experience*	*Quality of education*	*Post-school Investment*	*Starting Earnings*	*Nature of employment*
	Y_t	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8
Y_t	1.000	0.18362	—0.18156	0.70766	0.37532	0.041457	0.29502	0.49097	—0.30253
x_1		1.000	0.25979	0.46280	0.72967	—0.23444	0.0000	—0.48222	0.30462
x_2			1.000	0.419	—0.110	0.236	0.0114	—0.259	0.848
x_3				1.000	0.242	0.0711	0.137	0.133	0.322
x_4					1.000	—0.0653	0.0968	—0.229	—0.190
x_5						1.000	0.0231	0.0136	0.226
x_6							1.000	0.0466	—0.332
x_7								1.000	—0.331
x_8									1.000

TABLE 3.7

Correlation Matrix (Linear): E.B.C. Graduates—N=24

Variables	*Present Earnings*	*Age*	*Education*	*Occupational Rank*	*Experience*	*Quality of Education*	*Post-school Investment*	*Starting Earnings*	*Nature of Employment*
	Y_t	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8
Y_t	1.000	0.598	0.164	0.683	0.558	0.144	0.151	0.270	0.0459
x_1		1.000	0.371	0.722	0.944	—0.0390	0.423	—0.164	0.0921
x_2			1.000	0.548	0.278	0.0000	0.639	0.00376	0.912
x_3				1.000	0.696	0.102	0.534	0.0154	0.368
x_4					1.000	0.103	0.416	—0.261	—0.0115
x_5						1.000	—0.0253	0.106	0.0432
x_6							1.000	—0.356	0.490
x_7								1.000	0.0872
x_8									1.000

TABLE 3.8

Correlation Matrix (Linear): Aided Graduates—N=88

Variables	*Present Earnings*	*Age*	*Education*	*Occupational Rank*	*Experience*	*Quality of Education*	*Post-school Investment*	*Starting Earnings*	*Nature of Employment*
	Y_t	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8
Y_t	1.000	0.482	0.427	0.495	0.444	0.324	0.230	0.282	0.544
x_1		1.000	0.439	0.437	0.767	—0.220	0.399	—0.135	0.287
x_2			1.000	0.638	0.257	0.131	0.443	0.0809	0.814
x_3				1.000	0.238	0.0952	0.186	0.171	0.578
x_4					1.000	—0.212	0.291	—0.347	0.185
x_5						1.000	—0.205	0.420	0.273
x_6							1.000	—0.203	0.334
x_7								1.000	0.127
x_8									1.000

TABLE 3.9

Correlation Matrix (Linear): Unaided Graduates—N=101

Variables	*Present earnings*	*Age*	*Education*	*Occupational Rank*	*Experience*	*Quality of Education*	*Post-school Investment*	*Starting Earnings*	*Nature of Employment*
	Y_t	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8
Y_t	1.000	0.407	0.465	0.526	0.438	0.102	0.0150	0.422	0.436
x_1		1.000	0.518	0.494	0.947	—0.219	0.234	—0.106	0.423
x_2			1.000	0.540	0.456	0.0651	0.121	0.323	0.804
x_3				1.000	0.463	—0.0106	0.0158	0.220	0.381
x_4					1.000	—0.211	0.298	—0.123	0.336
x_5						1.000	—0.0971	0.167	0.0732
x_6							1.000	—0.308	0.122
x_7								1.000	0.296
x_8									1.000

TABLE 3.10

Correlation Matrix (Linear): 1961 Graduates—N=31

Variables	*Present earnings*	*Age*	*Education*	*Occupational Rank*	*Experience*	*Quality of Education*	*Post-school Investment*	*Starting Earnings*	*Nature of Employment*
	Y_1	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8
Y_1	1.000	0.165	0.304	0.386	0.201	0.403	−0.200	0.579	0.401
x_1		1.000	0.434	0.362	0.790	0.0705	0.157	0.0165	0.287
x_2			1.000	0.660	0.331	0.292	0.0315	0.398	0.812
x_3				1.000	0.372	0.283	−0.0593	0.233	0.400
x_4					1.000	−0.0456	0.140	−0.110	0.221
x_5						1.000	−0.0128	0.301	0.373
x_6							1.000	−0.306	0.319
x_7								1.000	0.319
x_8									1.000

TABLE 3.11

Correlation Matrix (Linear): 1965 Graduates—N=35

Variables	*Present earnings*	*Age*	*Education*	*Occupational Rank*	*Experience*	*Quality of Education*	*Post-school Investment*	*Starting Earnings*	*Nature of Employment*
	Y_t	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8
Y_t	1.000	0.187	0.242	0.453	0.148	0.336	0.241	0.367	0.562
x_1		1.000	0.443	0.320	0.484	−0.188	0.243	0.203	0.239
x_2			1.000	0.539	0.030	0.130	0.597	0.279	0.775
z_3				1.000	0.191	0.242	0.480	0.460	0.424
x_4					1.000	0.063	0.170	0.059	0.065
x_5						1.000	−0.010	0.180	0.314
x_6							1.000	0.039	0.502
x_7								1.000	0.318
x_8									1.000

TABLE 3.12

Correlation Matrix (Linear): 1970 Graduates—N=53

Variables	*Present earnings*	*Age*	*Education*	*Occupational Rank*	*Experience*	*Quality of Education*	*Starting earnings*	*Nature of Employment*
	Y_t	x_1	x_2	x_3	x_4	x_5	x_6	x_7
Y_t	1.0000	0.040288	0.28233	0.41159	0.091412	0.28121	0.29995	0.26449
x_1		1.0000	0.29953	0.32331	0.50152	−0.34740	0.10994	0.33668
x_2			1.0000	0.41995	0.14031	0.068742	0.18445	0.92541
x_3				1.0000	0.034423	−0.031458	0.16906	0.40143
x_4					1.0000	−0.10709	0.019446	0.038823
x_5						1.0000	0.083759	0.032733
x_6							1.0000	0.32660
x_7								1.0000

TABLE 3.13

Correlation Matrix (Linear): 1975 Graduates—N=114

Variables	*Present earnings*	*Age*	*Education*	*Occupational Rank*	*Experience*	*Quality of Education*	*Post-school Investment*	*Starting earnings*	*Nature of Employment*
	Y_1	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8
Y_1	1.000	0.335	0.434	0.531	0.281	0.165	0.203	0.563	0.469
x_1		1.000	0.478	0.460	0.774	−0.164	0.349	−0.0125	0.402
x_3			1.000	0.589	0.256	0.109	0.289	0.163	0.394
x_4				1.000	0.329	0.114	0.151	0.237	0.522
x_5					1.000	−0.162	0.318	−0.0317	0.219
x_6						1.000	−0.112	0.109	0.161
x_7							1.000	−0.237	0.243
x_7								1.000	0.200
x_2									1.000

TABLE 3.14

Correlation Matrix (Linear): B.C. Graduates—N=17

Variables	*Present earnings*	*Age*	*Education*	*Occupational Rank*	*Experience*	*Quality of Education*	*Parents' earnings*
	Y_i	x_1	x_2	x_3	x_4	x_5	x_6
Y_i	1.000	0.183	−0.181	0.707	0.375	0.0444	0.366
x_1		1.000	0.259	0.462	0.729	−0.234	0.111
x_2			1.000	0.418	−0.110	0.236	−0.291
x_3				1.000	0.242	0.0710	0.243
x_4					1.000	−0.0652	0.168
x_5						1.000	−0.370
x_6							1.000
x_7							
x_8							
x_9							
x_{10}							
x_{11}							

(*Contd. in width*)

Table 3.14 Contd.

Variables	Parents' education	Parents' Occupational Rank	Post-school Investment	Starting earnings	Nature of Employment
	x_7	x_8	x_9	x_{10}	x_{11}
Y_t	−0.0388	0.119	0.295	0.490	−0.303
x_1	−0.298	0.0234	0.000	0.482	0.304
x_2	−0.357	−0.422	0.0113	0.259	0.847
x_3	−0.0392	0.0480	0.137	0.132	0.322
x_4	−0.383	0.00839	0.0967	0.228	−0 190
x_5	−0.276	−0.0939	0.0231	0.0138	0.226
x_6	0.280	0.537	0.379	0.185	−0.456
x_7	1.000	0.568	−0.147	0.192	−0.203
x_8		1.000	−0.143	0.0849	−0.348
x_9			1.000	0.0466	−0.331
x_{10}				1.000	−0.331
x_{11}					1.000

TABLE 3.15

Correlation Matrix (Linear): Aided Graduates—N=76

Variables	*Present earnings*	*Age*	*Education*	*Occupational Rank*	*Experience*	*Quality of Education*	*Parents' earnings*
	Y_t	x_1	x_2	x_3	x_4	x_5	x_6
Y_t	1.000	0.381	0.275	0.415	0.434	0.288	−0.143
x_1		1.000	0.233	0.364	0.795	−0.326	−0.0066
x_2			1.000	0.499	0.0817	0.0184	−0.054
x_3				1.000	0.172	−0.00627	0.0597
x_4					1.000	−0.275	−0.0584
x_5						1.000	0.120
x_6							1.000
x_7							
x_8							
x_9							
x_{10}							
x_{11}							

(Contd. in width)

Table 3.15 Contd.

Variables	*Parents Education*	*Parents' Occupational Rank*	*Post-school Investment*	*Starting earnings*	*Nature of Employment*
	x_7	x_8	x_9	x_{10}	x_{11}
Y_t	−0.141	−0.0258	0.200	0.262	0.561
x_1	−0.948	0.00706	0.368	0.184	0.200
x_2	0.178	0.07664	0.458	0.138	0.795
x_3	0.121	0.258	0.126	0.201	0.489
x_4	−0.257	−0.158	0.273	0.303	0.111
x_5	0.00577	0.0634	−0.284	0.467	0.156
x_6	0.287	0.333	0.0384	0.0132	−0.0845
x_7	1.000	0.693	0.00610	0.142	0.0473
x_8		1.000	−0.0640	0.129	0.0129
x_9			1.000	0.255	0.415
x_{10}				1.000	0.183
x_{11}					1.000

TABLE 3.16

Correlation Matrix (Linear): Unaided Graduates—N=101

Variables	*Present earnings*	*Age*	*Education*	*Occupational Rank*	*Experience*	*Quality of Education*	*Parents' earnings*	*Parents' education*	*Parents' Occupational Rank*	*Post-school Investment*	*Starting earnings*	*Nature of Employment*
	Y_t	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}	x_{11}
Y_t	1.000	0.407	0.465	0.526	0.438	0.102	0.00200	0.0585	0.0987	0.0150	0.422	0.436
x_1		1.000	0.518	0.494	0.947	—0·219	0.0789	0.100	0.135	0.234	0.106	0.413
x_2			1.000	0.540	0.456	0.0651	—0.175	0.218	0.0179	0.121	0.323	0.804
x_3				1.000	0.463	—0.0106	—0.0300	0.174	0.0988	0.0158	0.220	0.381
x_4					1.000	—0.211	0.0705	0.0913	0.157	0.298	0.123	0.336
x_5						1.000	0.126	0.0826	—0.0294	—0.0971	0.167	0.0732
x_6							1.000	0.145	0.220	0.0392	0.0343	—0.203
x_7								1.000	0.594	0.290	0.0551	0.0558
x_8									1.000	0.261	0.139	—0.0567
x_9										1.000	0.308	0.122
x_{10}											1.000	0.296
x_{11}												1.000

TABLE 3.17

Correlation Matrix (Linear): 1965 Graduates—N=29

Variables	*Present Earnings*	*Age*	*Education*	*Occupational Rank*	*Experience*	*Quality of Education*	*Parents' earnings*	*Parents' education*	*Parents' Occupation Rank*	*Post-school Investment*	*Starting earnings*	*Nature of Employment*
	Y_t	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}	x_{11}
Y_t	1.000	0.601	0.218	0.356	0.548	0.446	0.461	—0.108	—0.420	—0.075	0.081	0.400
x_1		1.000	0.331	0.319	0.721	—0.002	0.298	0.046	—0.159	0.102	—0.109	0.187
x_2			1.000	0.459	0.008	0.252	0.048	—0.011	—0.046	0.518	0.264	0.745
x_3				1.000	0.217	0.270	0.083	0.210	—0.170	0.348	0.227	0.352
x_4					1.000	0.009	0.363	0.075	—0.200	0.121	—0.412	0.083
x_5						1.000	0.307	0.004	—0.131	—0.128	0.360	0.382
x_6							1.000	0.032	0.025	—0.053	—0.045	—0.053
x_7								1.000	0.548	—0.049	0.112	—0.114
x_8									1.000	—0.108	0.044	—0.199
x_9										1.000	0.198	0.436
x_{10}											1.000	0.232
x_{11}												1.000

Note: The difference in N is due to the omission of some extreme observations.

TABLE 3.18

Correlation Matrix (Linear): 1970 Graduates—N=45

Variables	*Present earnings*	*Age*	*Education*	*Occupational Rank*	*Experience*	*Quality of Education*	*Parents' Earnings*
	Y_i	x_1	x_2	x_3	x_4	x_5	x_6
Y_i	1.0000	0.02667	0.08285	0.3466	0.01798	0.4075	0.11324
x_1		1.0000	0.26965	0.34311	0.53265	−0.36758	0.03387
x_2			1.0000	0.36853	0.14134	0.084653	−0.019913
x_3				1.0000	−0.034568	−0.081634	−0.016262
x_4					1.0000	−0.068612	−0.08281
x_5						1.0000	−0.04788
x_6							1.0000
x_7							
x_8							
x_9							
x_{10}							
x_{11}							

(Contd. in width)

Table 3.18 Contd.

Variables	*Parents' Education*	*Parents' Occupational Rank*	*Post-school Investment*	*Starting Earnings*	*Nature of Employment*
	x_7	x_8	x_9	x_{10}	x_{11}
Y_t	0.03522	0.00414	0.44048	0.07925	0.03831
x_1	0.19997	0.47317	−0.08700	0.17001	0.29454
x_2	0.18056	0.24557	−0.033187	0.050577	0.94764
x_3	0.070207	0.14129	−0.046412	0.008398	0.34826
x_4	0.05355	0.018975	0.021078	0.022848	0.039223
x_5	−0.009596	−0.19904	0.17824	0.04704	0.050658
x_6	0.17837	0.042900	0.45181	−0.011412	−0.056344
x_7	1.0000	0.29071	0.10763	0.24907	0.05956
x_8		1.0000	0.12450	0.26644	0.34149
x_9			1.0000	0.38885	0.081368
x_{10}				1.0000	0.030603
x_{11}					1.0000

TABLE 3.19

Correlation Matrix (Linear); 1975 Graduates—N=114

Variables	*Present Earnings*	*Age*	*Education*	*Occupational Rank*	*Experience*	*Quality of Education*	*Parents' Earnings*	*Parents' Education*	*Parents' Occupational Rank*	*Post-school Investment*	*Starting earnings*	*Nature of Employment*
	Y_t	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}	x_{11}
Y_t	1.000	0.277	0.398	0.534	0.314	0.167	0.036	0.032	—0.028	0.243	0.466	0.402
x_1		1.000	0.471	0.460	0.676	—0.164	—0.003	0.248	0.134	0.349	0.038	0.402
x_2			1.000	0.591	0.201	0.118	—0.0018	—0.038	—0.054	0.302	0.112	0.889
x_3				1.000	0.338	0.114	0.141	0.096	0.033	0.151	0.229	0.522
x_4					1.000	—0.173	—0.014	0.224	0.129	0.382	0.134	0.167
x_5						1.000	0.017	—0.003	0.022	—0.112	0.129	0.161
x_6							1.000	0.380	0.386	—0.035	0.058	—0.009
x_7								1.000	0.703	—0.065	0.050	—0.013
x_8									1.000	0.048	0.109	0.000
x_9										1.000	0.269	0.243
x_{10}											1.000	0.137
x_{11}												1.000

TABLE 3.20

Correlation Matrix (Semi-log Linear): B.C. Graduates—N=17

Variables	*Present earnings*	*Age*	*Education*	*Occupational Rank*	*Experience*	*Quality of Education*	*Post-school Investment*	*Starting earnings*	*Nature of Employment*
	Y_t	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8
Y_t	1.000	0.144	−0.215	0.687	0.337	0.0059	0.326	0.523	−0.355
x_1		1.000	0.259	0.462	0.657	−0.234	0.0337	−0.455	0.304
x_2			1.000	0.414	−0.175	0.226	0.0021	0.232	0.846
x_3				1.000	0.212	0.071	0.137	0.130	0.322
x_4					1.000	−0.083	0.153	−0.183	−0.313
x_5						1.000	0.0231	0.0265	0.226
x_6							1.000	0.026	−0.331
x_7								1.000	−0.361
x_8									1.000

TABLE 3.21

Correlation Matrix (Semi-log Linear): E.B.C. Graduates—N=24

Variables	*Present earnings*	*Age*	*Education*	*Occupational Rank*	*Experience*	*Quality of Education*	*Post-school Investment*	*Starting earnings*	*Nature of Employment*
	Y_t	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8
Y_t	1.000	0.643	0.201	0.745	0.591	0.175	0.179	0.205	0.068
x_1		1.000	0.378	0.722	0.898	−0.039	0.423	−0.244	0.092
x_2			1.000	0.551	0.126	0.0098	0.645	−0.059	0.906
x_3				1.000	0.596	0.101	0.534	−0.021	0.367
x_4					1.000	0.116	0.322	−0.264	−0.169
x_5						1.000	−0.025	0.141	0.043
x_6							1.000	−0.420	0.489
x_7								1.000	0.0778
x_8									1.000

TABLE 3.22

Correlation Matrix (Semi-log Linear): Aided Graduates—N=88

Variables	*Present Earnings*	*Age*	*Education*	*Occupational Rank*	*Experience*	*Quality of Education*	*Post-school Investment*	*Starting Earnings*	*Nature of Employment*
	Y_t	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8
Y_t	1.000	0.534	0.477	0.527	0.427	0.271	0.261	0.211	0.490
x_1		1.000	0.425	0.437	0.706	−0.220	0.399	−0.166	0.287
x_2			1.000	0.641	0.173	0.131	0.448	0.083	0.818
x_3				1.000	0.197	0.095	0.186	0.209	0.578
x_4					1.000	−0.223	0.327	−0.349	0.097
x_5						1.000	−0.205	0.407	0.273
x_6							1.000	−0.201	0.334
x_7								1.000	0.124
x_8									1.000

TABLE 3.23

Correlation Matrix (Semi-log Linear): Unaided Graduates—N=101

Variables	*Present earnings*	*Age*	*Education*	*Occupational Rank*	*Experience*	*Quality of Education*	*Post-school Investment*	*Starting earning*	*Nature of employment*
	Y_i	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8
Y_i	1.000	0.401	0.466	0.569	0.514	0.127	0.038	0.344	0.390
x_1		1.000	0.513	0.494	0.860	−0.219	0.234	−0.172	0.413
x_2			1.000	0.543	0.406	0.074	0.141	0.310	0.803
x_3				1.000	0.479	−0.010	0.015	0.181	0.381
x_4					1.000	−0.195	0.282	−0.131	0.306
x_5						1.000	−0.097	0.230	0.0732
x_6							1.000	−0.271	0.122
x_7								1.000	0.257
x_8									1.000

TABLE 3.24

Correlation Matrix (Semi-log Linear): 1961 Graduates—N=31

Variables	*Present earnings*	*Age*	*Education*	*Occupational Rank*	*Experience*	*Quality of Education*	*Post-school Investment*	*Starting earnings*	*Nature of employment*
	Y_t	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8
Y_t	1.000	0.330	0.367	0.508	0.571	0.429	0.232	0.439	0.396
x_1		1.000	0.425	0.362	0.674	0.0705	0.157	0.112	0.287
x_2			1.000	0.672	0.240	0.309	0.0413	0.574	0.817
x_3				1.000	0.380	0.283	—0.059	0.377	0.400
x_4					1.000	0.135	—0.098	0.0078	0.159
x_5						1.000	—0.012	0.352	0.373
x_6							1.000	—0.189	0.065
x_7								1.000	0.427
x_8									1.000

TABLE 3.25

Correlation Matrix (Semi-log Linear): 1965 Graduates—N=29

Variables	*Present earnings*	*Age*	*Education*	*Occupational Rank*	*Experience*	*Quality of Education*	*Post-school Investment*	*Starting earnings*	*Nature of employment*
	Y_i	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8
Y_i	1.000	0.565	0.278	0.497	0.305	0.433	0.0057	0.233	0.445
x_1		1.000	0.335	0.319	0.639	−0.0019	0.102	−0.0138	0.187
x_2			1.000	0.469	−0.050	0.249	0.525	0.353	0.745
x_3				1.000	0.201	0.269	0.348	0.350	0.352
x_4					1.000	−0.118	0.190	−0.386	0.044
x_5						1.000	−0.128	0.398	0.382
x_6							1.000	−0.129	0.435
x_7								1.000	0.321
x_8									1.000

TABLE 3.26

Correlation Matrix (Semi-log Linear): 1970 Graduates—N=53

Variables	*Present earnings*	*Age*	*Education*	*Occupational Rank*	*Experience*	*Quality of Education*	*Starting earnings*	*Nature of Employment*
	Y_t	x_1	x_2	x_3	x_4	x_5	x_6	x_7
Y_t	1.000	0.0741	0.301	0.423	0.084	0.279	—0.029	0.280
x_1		1.000	0.299	0.323	0.501	—0.347	0.212	0.336
x_2			1.000	0.419	0.140	0.068	0.144	0.925
x_3				1.000	—0.034	—0.031	0.216	0.401
x_4					1.000	—0.107	0.120	0.039
x_5						1.000	—0.054	0.033
x_6							1.000	0.199
x_7								1.000

TABLE 3.27

Correlation Matrix (Semi-log Linear): 1975 Graduates—N=114

Variables	*Present earnings*	*Age*	*Education*	*Occupational Rank*	*Experience*	*Quality of Education*	*Post-school Investment*	*Starting earnings*	*Nature of employment*
	Y_i	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8
Y_i	1.000	0.277	0.398	0.534	0.314	0.167	0.243	0.466	0.402
x_1		1.000	0.471	0.460	0.676	—0.164	0.349	—0.038	0.402
x_2			1.000	0.591	0.201	0.118	0.302	0.112	0.889
x_3				1.000	0.338	0.114	0.151	0.229	0.522
x_4					1.000	—0.173	0.382	—0.134	0.167
x_5						1.000	—0.112	0.129	0.161
x_6							1.000	—0.269	0.243
x_7								1.000	0.137
x_8									1.000

TABLE 3.28

Correlation Matrix (Semi-log Linear): Aided Graduates—N=76

Variables	*Present earnings*	*Age*	*Education*	*Occupational Rank*	*Experience*	*Quality of Education*	*Parents' earnings*	*Parents' education*	*Parents' Occupational Rank*	*Post-school Investment*	*Starting earning*	*Nature of employment*
	Y_i	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}	x_{11}
Y_i	1.000	0.469	0.324	0.437	0.437	0.216	−0.158	−0.188	−0.029	0.233	0.202	0.424
x_1		1.000	0.228	0.364	0.726	−0.326	−0.0061	−0.094	−0.0070	0.368	0.234	0.200
x_2			1.000	0.500	0.0465	0.0146	−0.0548	0.189	0.0861	0.459	0.162	0.787
x_3				1.000	0.175	−0.0062	0.0597	0.121	0.258	0.126	0.251	0.489
x_4					1.000	−0.258	−0.102	−0.283	−0.237	0.288	0.304	0.0906
x_5						1.000	0.120	0.0057	0.063	−0.284	0.449	0.155
x_6							1.000	0.287	0.333	0.0384	0.0551	0.0845
x_7								1.000	0.692	0.0061	0.204	0.0473
x_8									1.000	−0.0640	0.153	0.0129
x_9										1.000	0.249	0.415
x_{10}											1.000	0.196
x_{11}												1.000

TABLE 3.29

Correlation Matrix (Semi-log Linear): Unaided Graduates—N = 101

Variables	*Present earnings*	*Age*	*Education*	*Occupational Rank*	*Experience*	*Quality of Education*	*Parents' earnings*	*Parents' education*	*Parents' occupational Rank*	*Post-school Investment*	*Starting earnings*	*Nature of employment*
	Y_t	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}	x_{11}
Y_t	1.000	0.401	0.466	0.569	0.514	0.127	0.0147	0.066	0.082	0.038	0.344	0.390
x_1		1.000	0.513	0.494	0.860	−0.219	0.0789	0.100	0.135	0.234	0.172	0.413
x_2			1.000	0.543	0.406	0.0746	−0.170	0.241	0.0381	0.141	0.310	0.803
x_3				1.000	0.479	−0.0106	−0.0500	0.174	0.0987	0.0158	0.181	0.381
x_4					1.000	−0.195	0.0840	0.0893	0.198	0.282	0.131	0.306
x_5						1.000	0.126	0.0826	−0.0294	−0.0971	0.230	0.0732
x_6							1.000	0.145	0.220	0.0392	−0.0534	−0.203
x_7								1.000	0.594	0.290	0.0524	0.0558
x_8									1.000	0.261	0.0789	0.0567
x_9										1.0000	0.271	1.122
x_{10}											1.000	0.257
x_{11}												1.000

TABLE 3.30

Correlation Matrix (Semi-log Linear): 1965 Graduates—N=29

Variables	*Present earnings*	*Age*	*Education*	*Occupational Rank*	*Experience*	*Quality of Education*	*Parents' earnings*	*Parents' education*	*Parents' occupational Rank*	*Post-school Investment*	*Starting earnings*	*Nature of employment*
	Y_i	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}	x_{11}
Y_i	1.000	0.565	0.278	0.497	0.305	0.433	0.318	−0.152	−0.327	0.0057	0.233	0.445
x_1		1.000	0.335	0.319	0.639	−0.0019	0.298	0.0457	−0.159	0.102	0.0138	0.187
x_2			1.000	0.469	−0.050	0.249	0.054	−0.009	−0.067	0.525	0.353	0.745
x_3				1.000	0.201	0.269	0.0828	0.210	−0.170	0.348	0.350	0.352
x_4					1.000	−0.118	0.213	0.0485	−0.147	0.190	0.386	0.0449
x_5						1.000	0.307	0.0045	−0.131	−0.128	0.398	0.383
x_6							1.000	0.0318	0.0247	−0.053	0.081	−0.052
x_7								1.000	0.548	−0.048	0.109	−0.143
x_8									1.000	−0.108	0.0079	−0.199
x_9										1.000	0.129	0.435
x_{10}											1.000	
x_{11}												1.000

TABLE 3.31

Correlation Matrix (Semi-log Linear): 1970 Graduates—N = 45

Variables	*Present earnings*	*Age*	*Education*	*Occupational Rank*	*Experience*	*Quality of Education*	*Parents' earnings*	*Parents' education*	*Parents' occupational Rank*	*Post-scool Investment*	*Starting earnings*	*Nature of employment*
	Y_t	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}	x_{11}
Y_t	1.000	0.065	0.125	0.355	0.027	0.367	0.018	0.063	0.024	0.456	0.169	0.079
x_1		1.000	0.269	0.344	0.532	−0.367	0.216	0.199	0.473	−0.088	0.201	0.294
x_2			1.000	0.368	0.141	0.084	0.004	0.180	0.245	0.033	0.072	0.947
x_3				1.000	−0.034	−0.081	0.039	0.070	0.141	−0.046	0.170	0.348
x_4					1.000	−0.068	0.016	0.053	−0.019	−0.021	0.118	0.039
x_5						1.000	−0.145	−0.009	−0.199	0.178	0.055	0.050
x_6							1.000	0.304	0.097	0.302	0.172	−0.047
x_7								1.000	0.291	0.107	0.075	0.059
x_8									1.000	0.124	0.088	0.342
x_9										1.000	0.482	−0.081
x_{10}											1.000	0.106
x_{11}												1.000

TABLE 3.32

Correlation Matrix (Semi-log Linear): 1975 Graduates—N=114

Variables	*Present earnings*	*Age*	*Education*	*Occupational Rank*	*Experience*	*Quality of education*	*Parents' earnings*	*Parents' education*	*Parents' occupational Rank*	*Post-school Investment*	*Starting earnings*	*Nature of employment*
	Y_i	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}	x_{11}
Y_i	1.000	0.278	0.398	0.535	0.315	0.168	0.037	0.032	—0.003	0.244	0.466	0.403
x_1		1.000	0.478	0.460	0.676	—0.164	—0.003	0.248	0.134	0.349	0.038	0.402
x_2			1.000	0.591	0.201	0.119	—0.002	—0.038	—0.055	0.303	0.112	0.889
x_3				1.000	0.329	0.114	0.141	0.096	0.033	0.151	0.237	0.522
x_4					1.000	—0.163	0.051	0.243	0.158	0.318	0.081	0.219
x_5						1.000	0.017	—0.003	0.022	—0.112	0.109	0.161
x_6							1.000	0.380	0.386	—0.35	0.029	0.009
x_7								1.000	0.703	—0.065	0.036	—0.013
x_8									1.000	0.048	0.091	0.004
x_9										1.000	0.237	0,243
x_{10}											1.000	0.200
x_{11}												1.000

4

Private Rates Of Return And Distribution Of Schooling And Earnings

Introduction

THE present chapter is divided into five sections as follows.

The components and estimation of private costs (investment) are presented in the first section. The description of life-time earnings, estimated on the basis of regression equations, is presented in section two which is followed by an estimation of private rates of return in section three. Section four examines the short-term effects on the distribution of earnings between cohorts (i.e., between graduate respondents of four bench-mark years and of different socio-economic groups) and between self-employed and employee graduates. It also evaluates the whole issue of the trend in the long-term (i.e., between generations) distribution of earnings in the light of (a) continuous expansion of education and (b) changing characteristics of labour force in terms of its educational attainment, age-structure and employment-structure. As usual, the last section summarises the main findings of this chapter.

I

COSTS OF EDUCATION

Costs of education in our analysis are private costs. Institutional costs, therefore, do not enter directly into the cost-structure though we make use of them to derive 'over-all' subsidy. Costs are treated as equivalent to investment in a rate of return analysis.

These are money costs expressed in current prices.

Cost components

Costs included here are (a) opportunity cost, (b) fee cost, (c) unrecorded non-tuition costs and (d) subsidies. Total costs are equal to A+B+C=D.

Opportunity cost

The opportunity cost is applicable in the case of all observations, namely, graduates brothers and sisters, parents. The opportunity cost of a member at his primary and middle school level is ignored. Only for secondary and higher educational level opportunity costs are considered equivalent to the earnings of primary and middle school teachers respectively. We have taken mean education of each group—if it is 15 years, first 7 are elementary, 8-11 are secondary and 12-15 are college and beyond 15 it is post-graduation.

As far as post-school investment (PSI) is considered, we have classified observations into three groups—(i) those who have improved their educational qualifications but without any change of job, (ii) those who have added to their schooling and also changed jobs and (iii) those who have only changed jobs without adding to qualifications. Post-school investment is simply added as a cost wherever relevant.

Fee cost

Fee costs are actually incurred costs as applicable to different levels of education. These are recorded in the case of unaided students while in the case of aided and E.B.C. they are adjusted so that they represent net of subsidy. For B.C. students there are no tuition costs. For school level we could get 1965-66 average fee costs. On the basis of the consumer price index for industrial workers, Ahmedabad centre, fee costs were ajusted for different years. Fee costs for college level are actual costs for the relevant years collected from the various institutions of the university.

Unrecorded non-tuition costs

These costs include items like books and stationery, food bill and other expenditures. Average expenditures of students of different income groups (parents) obtained from a survey of students of the Baroda University[1] and adjusted for different years on

the basis of consumer price index.

Subsidy

Subsidy in our analysis is defined in its wider sense. It inclu des all cash benefits given to B.C., fee concessions of all types to E.B.C. and Aided. Average subsidy per annum is calculated on the basis of the information supplied by our respondents. Finally, we have estimated even the benefit from indirect subsidy in the sense that total cost of education per candidate including institutional cost is always greater than the fee cost. However, in working out the costs we have taken the direct subsidy while for our final analysis we have kept in view the indirect subsidy also. Subsidy is a deduction from the total cost.

For respondents' brothers and sisters with mean education of 14 years, we have employed the same method of cost estimation as is employed for respondents. Costs, so estimated, relate to their mean educational attainment.

On the contrary, for parents, we have to make a slight alteration in the method. Parents with mean schooling of 10.5 years, were in schools during 1930s. We used the average tuition fee per pupil of primary and secondary schools for the relevant years, readily available in published form. Thus, there was no need to escalate tuition fee cost. Average annual earnings of a primary school teacher, based on pay scales for primary school teachers in those days, is treated as equivalent to alternative earnings forgone by parents when they were in secondary schools.

Average non-tuition (unrecorded) cost is assumed to be as much as average tuition cost. Having calculated private costs separately for respondents, their brothers, sisters and their parents, it was rather easy to estimate costs for *all* of them jointly. The per cent age-wise distribution of respondents, their brothers/sisters and parents is 40.45, 40.95 and 18.56 respectively of the total. These percentages have been used as weights to estimate the costs of mean education of 14.5 years—the educational attainment of all persons taken together.

The costs thus calculated are presented in Table 4.1 alongside private human capital formation. Private investments have initially tended to increase slowly. The rate of increase of 82.31 per cent between 1970 and 1975 has been the fastest. Private human capital formation, obtained by multiplying average private costs by

output, shows seven times increase in money terms and less than two times (1.73 times) increase in real terms (see the Index of Human Capital Formation). Investment per unit of output in real terms given in col. 9 of the Table has continuously fallen upto 1970. It has increased in 1975 but has been lower than in 1961. In terms of investment-output ratio this implies an improvement in private efficiency (a lower investment-output ratio).

II

LIFE-TIME EARNINGS

Earnings profiles to estimate returns have been so far constructed on the basis of very scant data and are thus very crude and not more than mere guess-work.

Earnings profiles give life-time earnings. There can be (a) age, education, earnings profiles, (b) education, experience, earnings profiles or (c) education, occupation, earnings profiles. They are so framed that they are made to correspond to the assumptions underlying human capital theory : that initially earnings rise slowly, then the rate of growth in earnings picks up with the accumulation of experience, reaches the peak (it is early in case of persons with less amount of schooling). Once the peak is reached, it is assumed to have a tendency of deceleration in the rate of increase, deceleration being faster in case of persons with low investment in human capital because of obsolescence of human capital. It declines, especially in old age, when net investment becomes negative.

The previous chapter has brought to the fore the relevance of variables incorporated in the earnings function. They together explain earnings differentials ranging from as low as 27 per cent to as high as 87 per cent. We have regressed earnings on the human capital variables with the help of the data from our field survey. From these regression equations, the life-time earnings profiles are constructed by extrapolating the earnings, taking experience and age as variables and others as constants.

Life-time earnings are estimated for various categories of respondents, their parents and brothers and sisters and for '*all*' taken together.

The important aspects of life-time earnings so determined are presented in the following pages.

Mean present earnings, mean age, mean experience and mean education present an interesting reading. All four move in consonance. This holds for our respondents when classified by their socio-economic status and by the year of graduation. Mean earnings tend to increase with the increase in age, experience and education (see Table 4.2).

Given the level of educational attainment, the variation in earnings is accounted for by the variation in age and experience. The mean earnings of E.B.C. graduates of Rs. 10,852 is higher than Rs. 8,078 of B.C. graduates because of more years of experience rather than variation either in age or education. As against this, higher mean earnings of aided graduates *vis-a-vis* E.B.C. can be explained both in terms of age and education.

On the other hand, the 'pure' effect of education on earnings can be seen by comparing respondent graduates with all persons. Though the former group is younger in age and with nearly one-half experience than that of the latter group, the mean earnings of respondents is higher by full 6 per cent because of higher mean education.

That human capital depreciates with age can be easily observed from the mean earnings of parents which is lower than that of both (all persons and respondents).

Linear increases in life-time earnings presented in Table 4.3 appear to be in conformity on the whole with the theory broadly.

Average annual growth rates show that earnings rise at a diminishing rate over the working life. Rates have declined also as net investment becomes negative especially in old age. The annual increase in rates during the first decade in three cases is slightly above the rates obtained for the first quinquennium, confirming the prediction of the theory that the rate picks up with the on-the-job experience or age or post-school investment before it starts tapering off subsequently. The pattern of annual rates of growth of earnings also shows a higher rate for more investment in schooling. The rate for parents, with 10.5 years of mean schooling, of 1.52 per cent is the lowest. The rate for brothers and sisters and 'all' persons of more than 2 per cent coincides with their mean education of 14 years. It is the highest (6.62 per cent) for graduates with nearly 17 years of education. (see *Figure 2*).

An indirect evidence of the reliability of the estimated life-time earnings is given by the complete correspondence in five cases

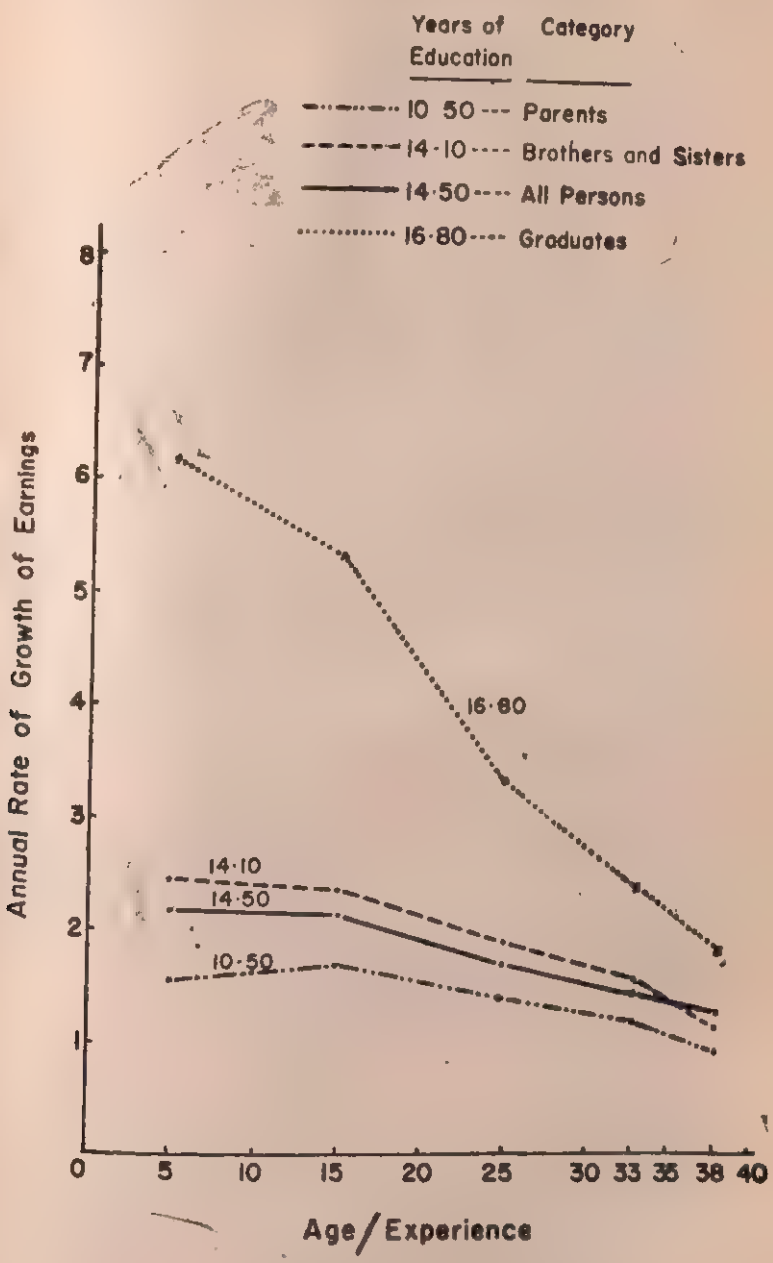


FIG. 1 : **Age, Experience, Education, Earnings Profile**

between the estimated mean earnings and the mean present earnings at relevant mean ages given by regression equations. In the terminology of a scattered diagram, this implies a good fit of the curve.

III

PRIVATE RATES OF RETURN

Methdology

Rate of return in our analysis relates to the earnings/investment ratio. Therefore, two important values are : (i) earnings of a given cohort over their entire life-time which has been dis cussed in the previous section and (ii) investment which is the private costs of education, discussed earlier in the present chapter.

The average starting age of earnings is the beginning point for the calculation of the flow of earnings. Thus, the 'stream' of earnings begins after the investment is made. Learning and earning together was rarely reported by our respondents. Therefore, we have taken the 'present value' of earning streams to compare with the 'investment' which is already incurred. Thus, the 'investment' (cost) is treated as at one point when education is completed. The investment thus considered is inclusive of post-school investment, which in our case mostly implies addition to educational qualifications while on-the-job. Unlike the 'screening hypothesis', in the Indian situation in many large public secto undertakings job promotion is determined by qualifications improvement.

Earnings are discounted to get their present value. There ratio is, then, expressed as a linear average per year. Thus,

$$\sum \frac{E_n}{(1+r)^n}$$

are the present value of income streams, where 'E' are earnings per annum, 'r' is the rate of discount and 'n' relates to the number of years. Therefore, rate of return can be exrpressed as

$$= \frac{1}{n} \sum \frac{E_n}{(1+r)^n} \text{ Investment } \Sigma 100$$

In the literature, rates of return are crude as well as adjusted. They are adjusted for (a) the rate of economic growth since life-time earnings projected on cross-section data do not take account

of the growth factor; (b) the ability factor on the premise that a portion of return owes to native intelligence; (c) unemployment rate taking the average waiting period prior to earning; and (d) survival rate which normally shortens the productive life span.

The average annual rate of economic growth per capita of 1.4 per cent observed for the Indian economy was employed for the adjustment in the rate of return. However, it should be clarified that partly the growth factor was taken care of as earnings—starting and present—at two points of time were collected. On the other hand, as a proxy for 'ability' we took 'quality of education' (a dummy variable in our earnings function). Average waiting period for graduates of about half a year was estimated on the basis of information collected through the questionnaire.[2]

There is every reason to believe that the survival rate varies by education level attained and is above the national average in case of more educated persons. In our study, hardly any respondent had reported absenteeism from work due to prolonged illness or any sort of ailment.

We made an attempt to adjust rates of return accordingly but to our surprise we observed only a marginal variation between adjusted and unadjusted rates (see Table 4.4). The rates of return, we calculated, appear to be more refined as they are based on more detailed information and not on crude estimates as was the case in many previous works.[3]

Pattern of Rates of Return

Linear average return per year for graduates of two broad categories—(a) socio-economic group and (b) bench-mark year group, and for respondent parents, for brothers and sisters and for *all* persons are presented in Tables 4.4 and 4.5 respectively. Moreover, in Table 4.5 additional information regarding coefficient of variation of education and that of log earnings is also given alongside.

The rate of return for B.C. graduates is the highest at 18.23. This is followed by the rate of 16.62, 13.59 and 12.66 for E.B.C. unaided and the aided graduates respectively. The lowest rate for aided graduates is noteworthy. Rates of return for graduates of four benchmark years—1961, 1965, 1970 and 1975—show a declining tendency. The rates are highest for the *oldest* graduates (in age) and also with the highest mean education. They are

lowest for the youngest graduates and also with the lowest mean education. The highest rate is also three times the lowest. Rates do not show a high variation for the graduates of 1965 and 1970, having almost identical mean education.

The rate of return show an inverse relationship with the investment in education as revealed by mean education of each category. This point is clearly brought out by the highest rate of return of 40 per cent (with the lowest mean education of 10.5 years) and the lowest rate of return of 15.86 (with the highest mean education of 16.8 years). Returns are nearly equal for equal levels of education.

As is well known there is no strict agreement among scholars regarding the exact relationship between increments to earnings and increments to years of schooling. Within the limits of our data, the incremental returns can be shown either by comparing different categories of graduates with a common denominator or a numerarie or with different bases comparing successive cohorts with the previous. To be a little more precise, we could compare different groups with different years of schooling with groups of equal schooling. These two aspects of incremental returns are shown in Tables 4.6 and 4.7.

Taking B.C. as the numerarie, the incremental returns are all positive with E.B.C. as the highest and aided as the lowest. The incremental returns on the basis of bench-mark years data are trendless. Except for 1970 graduates, others are negative. Perhaps the explanation for this phenomenon lies beyond the present inquiry (The plan period after 1965 does not show steady growth. There were periods of recession and inflation).

Comparison between groups of different schooling years with a common base yields better results.

Additional schooling	*Incremental returns*
2.3	+ 1.5
2.7	+ 5.5
3.6	+20.3
4.0	+20.7
6.3	+14.0

Parents have had a mean education of 10.5 years; brothers

and sisters and all persons a little over 14 years of schooling, and graduates nearly 17. Placing the additional schooling years in an ascending order we find that incremental earnings begin to rise with additional schooling, reach a peak and then decline (see *Figure 3*). Perhaps this may have very important implications both to the theory of human capital and to policy. Incremental returns are about the maximum at a level of just over 14 years of schooling. While incremental returns are positive their behaviour clearly establishes that investment in education, much like investment in physical capital, is subject to the law of diminishing marginal returns.

How does the pattern of returns observed above look like when seen in the context of coefficients of variation both of education and log earnings?

All three—rates of return, coefficients of variations of education and log earnings—fall with the improvement in mean education (see Table 4.5). This confirms the much publicised hypothesis that greater rates of return and inequalities in the distribution of schooling and earnings would go hand in hand. It has also brought out the obvious that the higher the level of education, the lower is the rates of return. This observation brings to the fore the two determinants of the distribution of earnings, namely, the distribution of investments and their rates of return. A greater equality in personal income distribution goes with the better distribution of schooling on the one hand and lower rates of return on the other.

Higher absolute earnings (discounted life-time earnings) are associated with higher investments in education, supporting the thesis of the Human Capital Approach that people invest in education to derive higher future earnings. Assuming competitive labour market, the observed higher earnings would reflect higher productivity as rates of reward approximate marginal productivity.

Since level of earnings and levels of education are significantly correlated, one can easily explain the spurt in private demand for higher levels of education in India since Independence. This, in itself, strengthens the assumption of maximising individual economic welfare in the theory of human capital.

In terms of rate of return, the assumption of maximising economic welfare gets reflected in the higher percentage increase in enrolment, i.e., the higher the rate of return, the higher is the increase in enrolment. In our analysis, rates of return are higher

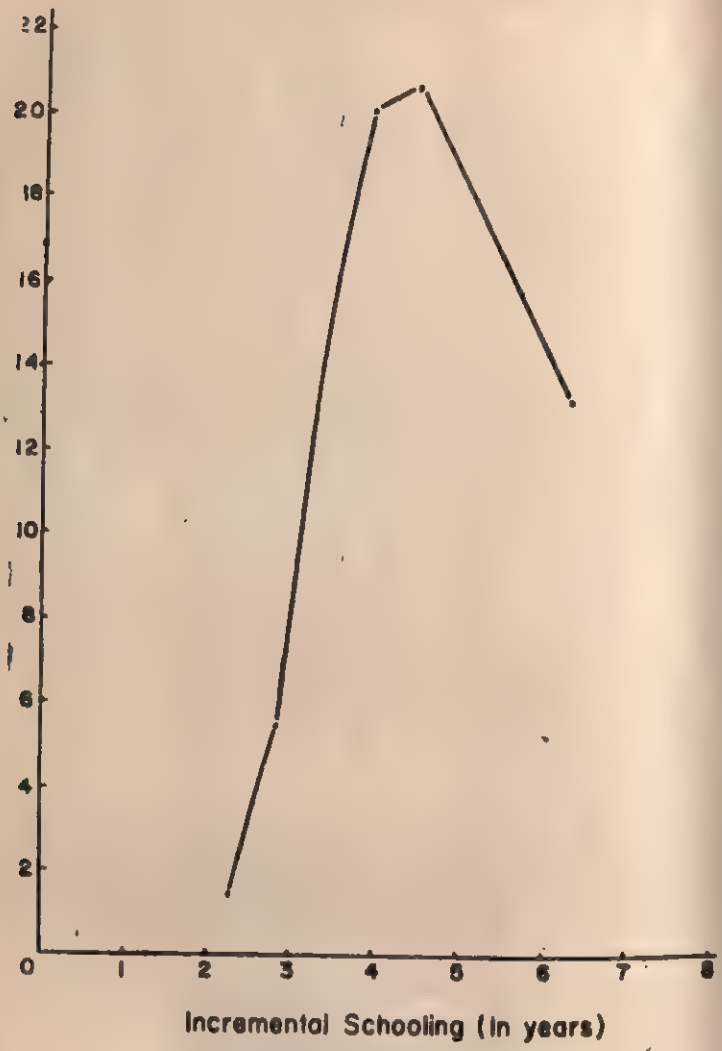


FIG. 3
Incremental Returns to Education

for B.C. and E.B.C. graduates and lower for the aided and unaided. As we have observed earlier, the annual rates of growth in enrolment are also higher in case of B.C. and E B.C. graduates; for unaided category, the growth in enrolment is as high as that of over-all enrolment whereas for the aided, it is the lowest.

When respondents were asked to choose the factors (in a five-point scale) which prompted them to go for higher education, economic factors were overwhelmingly stressed.

All the above evidences seem to lend support to the 'wage competition model'.[4]

In India, we have witnessed a much faster increase in the rate of stock of graduates and above and the expectation is that the rates would further increase in the initial years of 1980s.[5] This trend, then, is expected to further depress the incomes of the over-supplied highly educated persons *vis-a-vis* under-supplied less educated persons, bringing down the rates of return and finally resulting in more equal distribution of income. The competitiveness of the Indian labour market in this context has long been established by Mark Blaug and others. They write : "It seems true that equity considerations are holding up the bottom end of the scale. But at the top, it is clear that inflation is providing a convenient excuse for adjusting wages in accordance with the dictates of excess supply reflected in educated unemployment."[6]

A slowing down of the rate of growth of enrolment at the higher level of education, a recently observed phenomenon,[7] by influencing the growth of stock of educated persons in the late eighties and thereafter may create a new equilibrium of a different nature.

Apart from the competitiveness of the labour market, the structure of subsidy has played its role in the attainment of better distribution of personal income.

With regard to B.C., E.B.C., aided and unaided graduates, contrary to the hypothesis of higher rates of return and larger inequality in the distribution of schooling, we find higher rates of return associated with more even distribution of schooling revealed by the coefficient of variation of education. Heavy subsidies to B.C., and E.B.C. graduates have not only corrected unequal supply conditions but pushed up returns in relation to aided and unaided graduates. This possibly explains as high/higher a share of bottom 10 per cent of B.C., E.B.C. graduates both in education and earnings as that of bottom 10 per cent of aided and unaided

graduates, indicating a sort of greater horizontal equality. As shall be observed in the following section, the share of bottom 10 per cent of graduates in present earnings has improved over starting earnings at the expense of top 10 per cent. This is suggestive of a greater vertical income equality among graduates.

IV

DISTRIBUTION OF EDUCATION AND EARNINGS

In the introductory chapter the role of education in reducing earnings inequality has been stressed. Once the inequality of schooling narrows there follows narrowing of earnings inequality also. In Chapter 2 it has been shown empirically that the schooling inequality between generations (parents and their children) has been bridged and the average level of schooling is also higher among young persons than old. Further, the trend and ratio analyses have shown that the proportionate representation of B.C., E.B.C. students *vis-a-vis* aided and unaided in the total enrolment of students of the M.S. University has improved. The question raised here is: Has earnings inequality consequently declined? In the pages to follow an attempt is made to answer this fundamental question by employing various measures of inequality.

Relative Movement of Schooling and Earnings of Respondent Graduates :

It can be observed from Table 4.8 that the share of bottom 50 per cent of graduates in education over time, i.e., from 1961 to 1975 has consistently tended to increase from 42.58 per cent in 1961 to 46.23 per cent in 1975, nearly an increase of 9 per cent at the margin. Obviously, the share of top 50 per cent of graduates has registered a fall of 6.36 per cent at the margin. On the other hand, the share of top 10 per cent has virtually remained unchanged at around 12 per cent whereas that of bottom 10 per cent has jumped from 7.95 per cent to 9.34 per cent. This means bottom 10 or 50 per cent of graduates are slowly catching up with the top 10 or 50 per cent implying thereby narrowing of educational inequality at the higher education level, perhaps in India too.

We have got the information about money earnings of graduates

for two points of time—the starting earnings and the present earnings. How have the shares of various deciles in starting and present earnings tended to behave? The share of top 10 per cent of 1961, 1970 and 1975 graduates in present earnings has been lower than their share in starting earning whereas the share of bottom 36 per cent of graduates of the bench-mark years in present earnings has shown an improvement, the only exception being 1965 graduates (see Table 4.8). The share of bottom 10 per cent of 1970 and 1975 graduates only in present earning shows an improvement over starting earning. Unlike the consistent increase/fall in the share in enrolment of bottom/top 50 per cent of graduates of bench-mark years, the corresponding shares in starting and present earnings do not show a pattern.

The share of bottom 10 per cent of E.B.C. graduates in education is 11.11 per cent, suggesting a more than its equal share. The share of bottom 10 per cent of B.C. graduates of 7.8 per cent is comparable to that of 8.8 per cent for aided and unaided graduates. The combined share of bottom 50 per cent of graduates of all the four categories is in the vicinity of 44 to 47 per cent, i.e., almost on the line of perfect equality. The difference in educational achievement of the top and bottom 10 per cent of B.C. and E.B.C. graduates is much less pronounced than the corresponding top and bottom 10 per cent of the aided and unaided (Table 4.9).

The bottom 10 per cent of B.C. graduates accounts for a higher relative share in starting as well as present earnings. The respective shares are 4.74 and 6.97 per cent—an increase of 47 per cent at the margin. Barring unaided graduates, the share of bottom 10 per cent of the remaining three categories is higher in present earnings than in starting earnings. The share of top 10 per cent graduates, excluding aided graduates, has fallen. Similarly, the relative share of bottom 50 per cent in present earnings shows an improvement over that in starting earnings (with the exception of E.B.C. graduates)—the most outstanding is B.C. graduates whose share has jumped from 28.70 per cent to 35.30 per cent. The relative share of bottom 30 per cent of B.C., E.B.C., and Aided in present earnings has improved whereas that of unaided remained constant.

Consequent upon the increase in relative shares of bottom 10 per cent in present earnings of different categories of graduates in our sample, the disparity in the share of bottom 10 per cent

and top 10 per cent has narrowed. For example, the share of bottom 10 per cent in starting earnings (3.43 per cent) is barely 38.84 per cent of their share in education (8.83 per cent). The corresponding share in present earnings is higher at 41.20 per cent. As against this, the similarly worked out share of top 10 per cent shows a decline from 203.19 per cent to 187.5 per cent. The relative inequality which was more than five times came down to 4.5 times.

The share of bottom 50 per cent (all graduates) in starting earnings was 29.2 per cent. The share of the same group in the present earnings is 29.1 per cent. Obviously the other 50 per cent also has the same share. Therefore, there is scarcely any change from this point of view. But if we take the bottom 30 per cent and the top 10 per cent there seem to be impressive changes. The bottom 30 per cent accounted for 14.27 per cent of the earnings at the start, now it has improved to 14.64 per cent. This is a significant marginal gain for the bottom 30 per cent. The top 10 per cent, on the other hand, while shared 24.81 per cent, has lost and now shares 22.89 per cent. Again, the decline is marginally very significant. This shows that the tendency towards greater equality might be beginning. However, an equally important point is that the share of bottom 50 per cent in earnings (starting as well as present) is lower than that in education. On the other hand, the share of top 50 per cent is higher. This reflects a greater inequality in earnings than in education (see Table 4.9).

The distribution of schooling and earnings when respondents are classified into employees and self-employed shows that education is more evenly distributed between two—bottom 50 per cent of employees and self-employed accounting for 45 to 46 per cent and top 50 per cent accounting for 54 to 55 per cent. Coming to the question of distribution of earnings, distribution is more unequal with respect to self-employed than employees. The share of bottom 50 per cent self-employed in starting and present earnings is lower (the share of top 50 per cent being higher) than that of employees. Even for bottom each decile up to five deciles this holds (Table 4.10).

The Lorenz curves drawn separately for each bench-mark year of graduates and also for each category of graduates vividly bring out what has been said above about the distribution of schooling and earnings. (see *Figures 4 to 12*).

FIG. 4

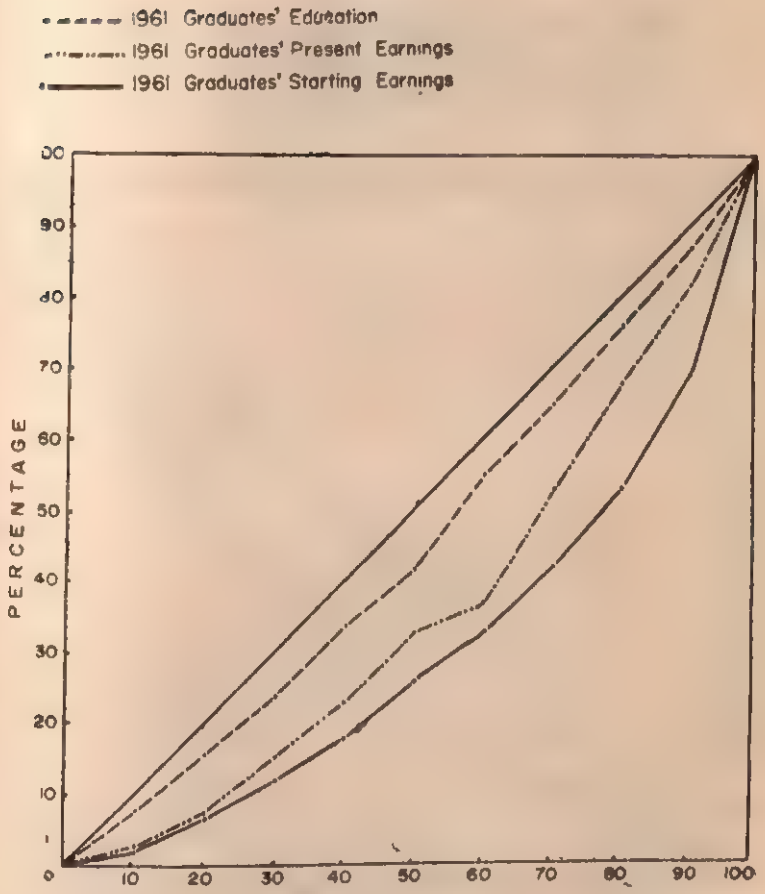

1961 Graduates' Education
1961 Graduates' Present Earnings
1961 Graduates' Starting Earnings
PERCENTAGE
0
10
20
30
40
50
60
70
80
90
100

FIG. 5

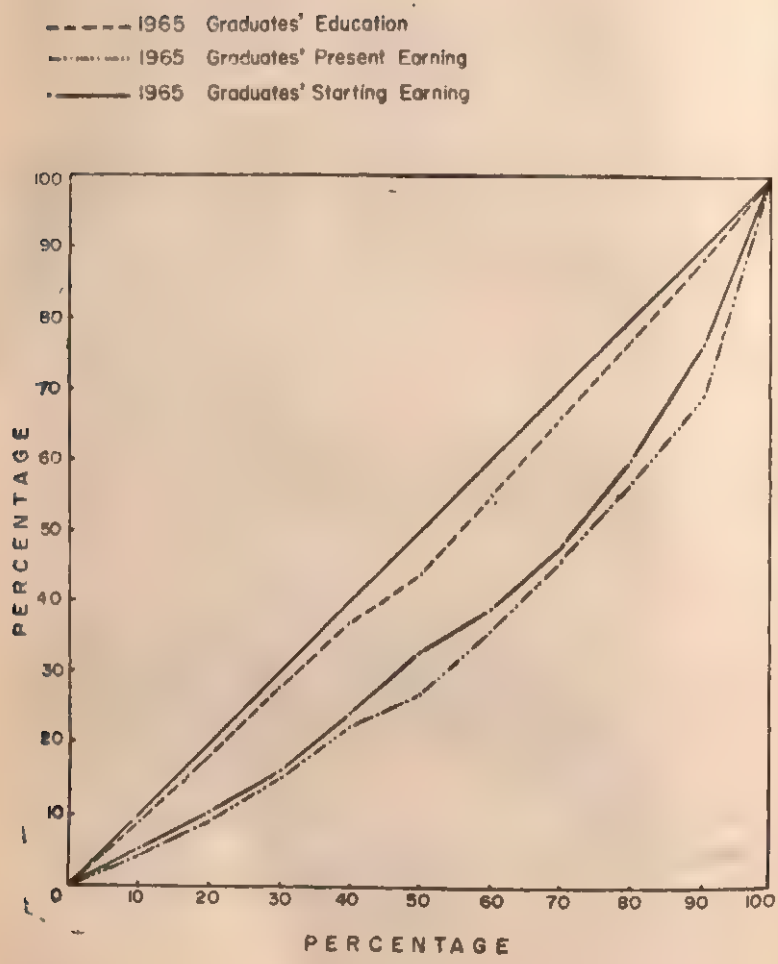

1965 Graduates' Education
1965 Graduates' Present Earning
1965 Graduates' Starting Earning
PERCENTAGE
PERCENTAGE
0
10
20
30
40
50
60
70
80
90
100

FIG. 6

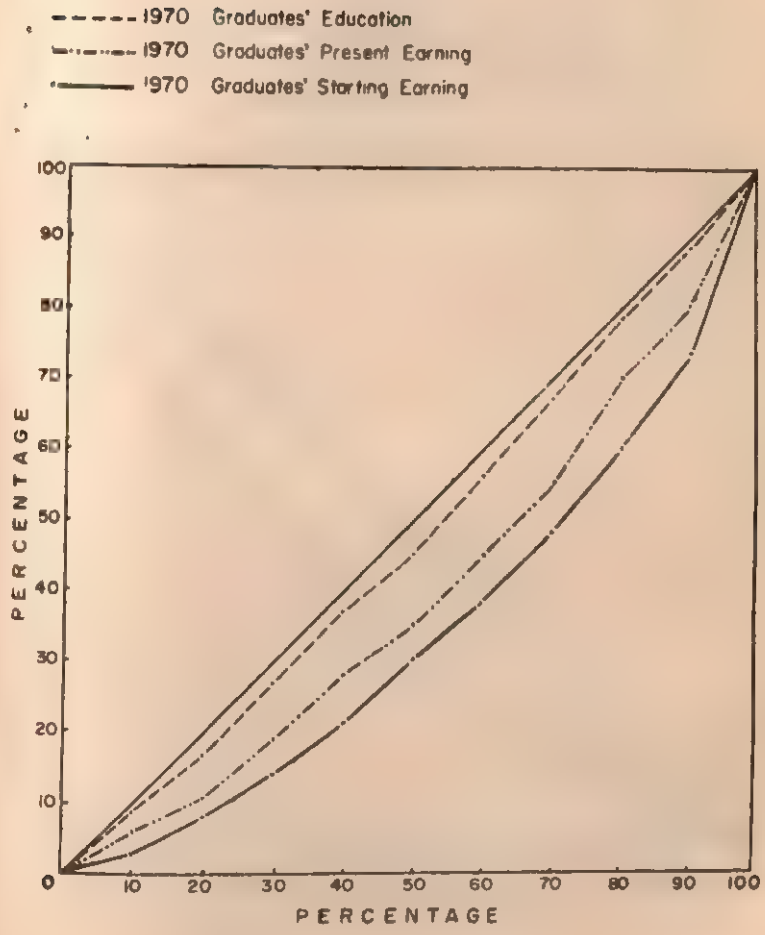

1970 Graduates' Education
1970 Graduates' Present Earning
1970 Graduates' Starting Earning
PERCENTAGE
PERCENTAGE
0
10
20
30
40
50
60
70
80
90
100

FIG. 7

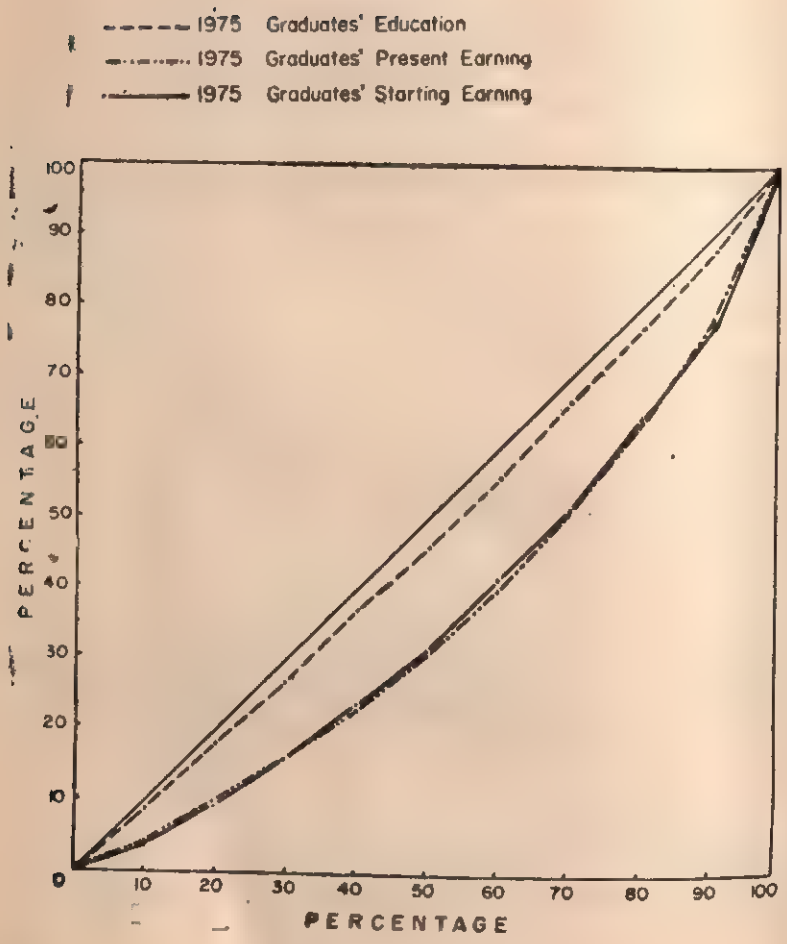

1975 Graduates' Education
1975 Graduates' Present Earning
1975 Graduates' Starting Earning
PERCENTAGE
PERCENTAGE
0
10
20
30
40
50
60
70
80
90
100

FIG. 8

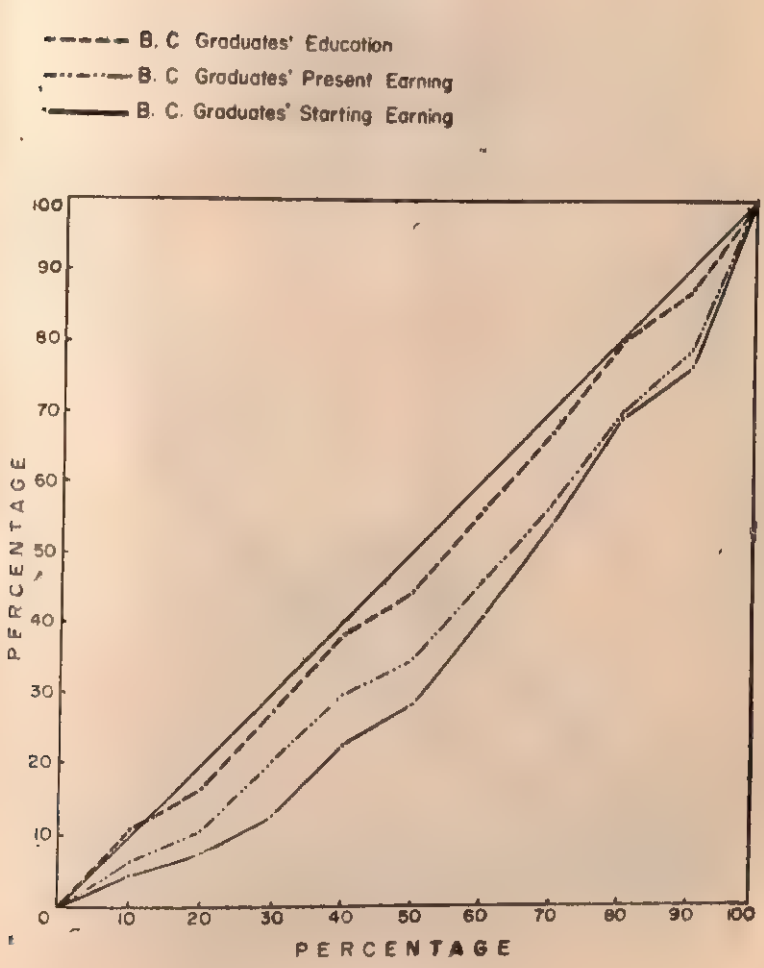

B. C Graduates' Education
B. C Graduates' Present Earning
B. C. Graduates' Starting Earning
PERCENTAGE
0
10
20
30
40
50
60
70
80
90
100
PERCENTAGE

FIG. 9

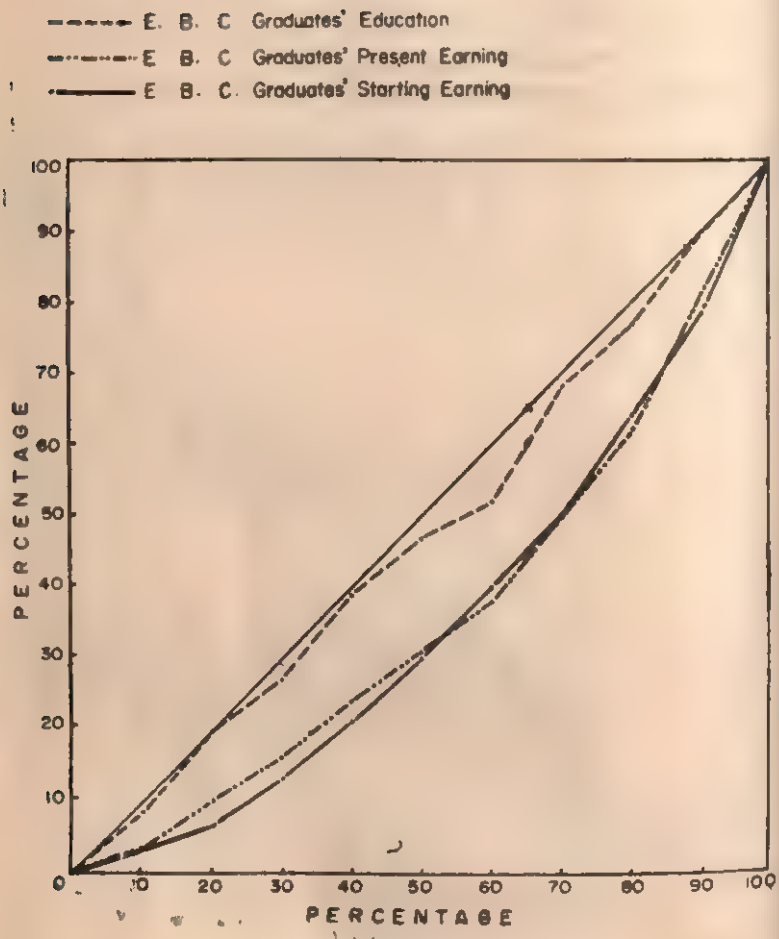

E. B. C Graduates' Education
E B. C Graduates' Present Earning
E B. C. Graduates' Starting Earning
PERCENTAGE
PERCENTAGE
0
10
20
30
40
50
60
70
80
90
100

FIG. 10

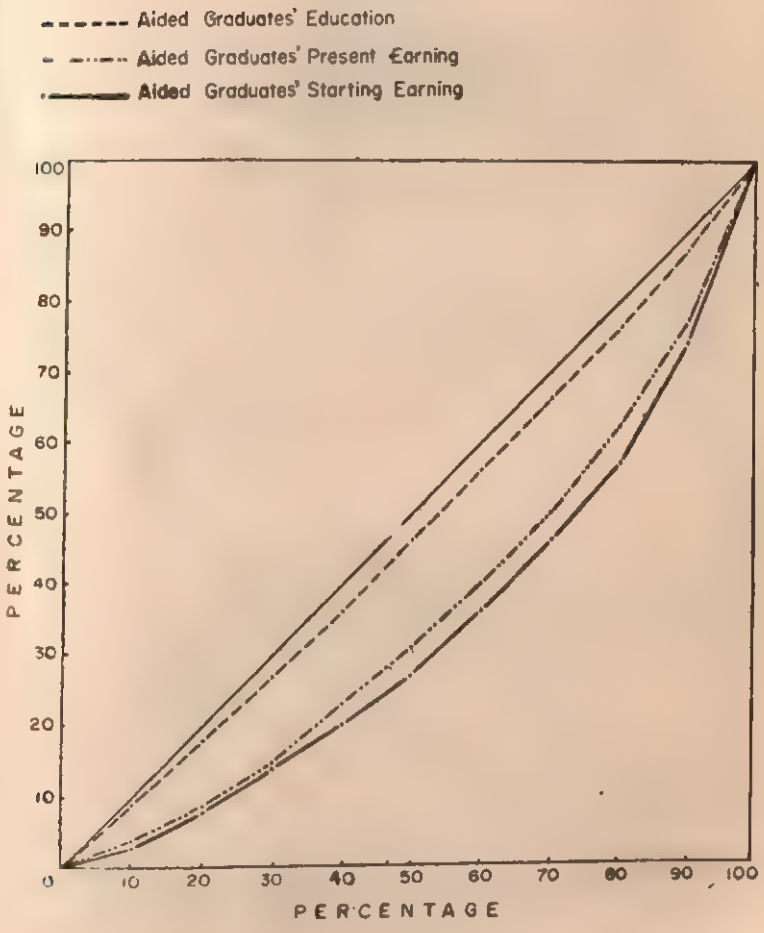

Aided Graduates' Education
Aided Graduates' Present Earning
Aided Graduates' Starting Earning
PERCENTAGE
PERCENTAGE
0
10
20
30
40
50
60
70
80
90
100

FIG. 11

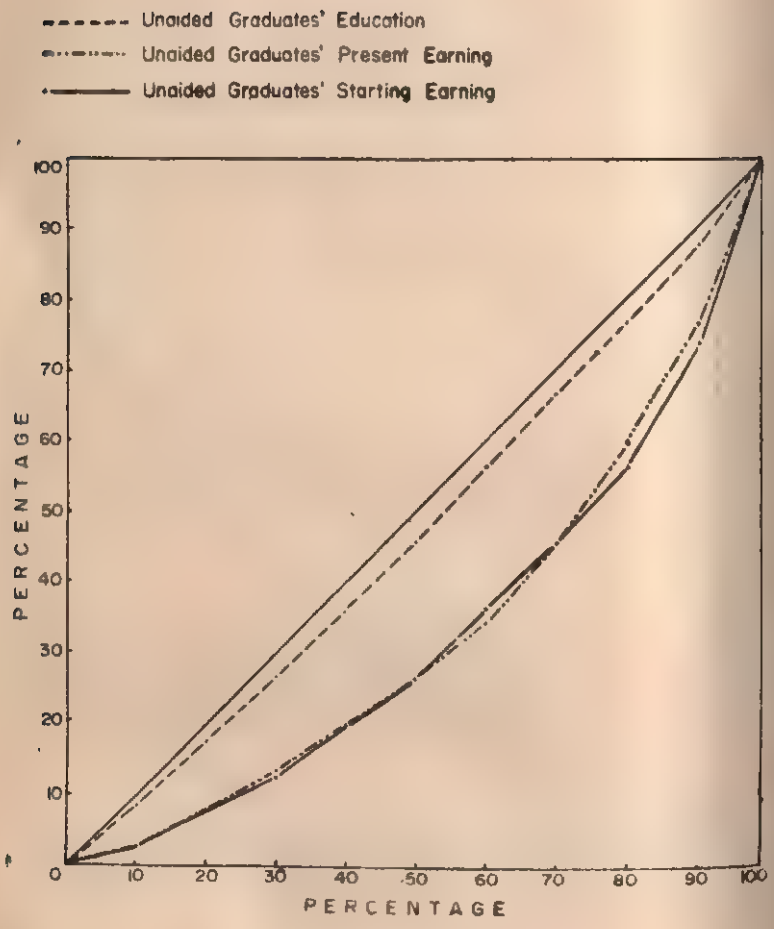
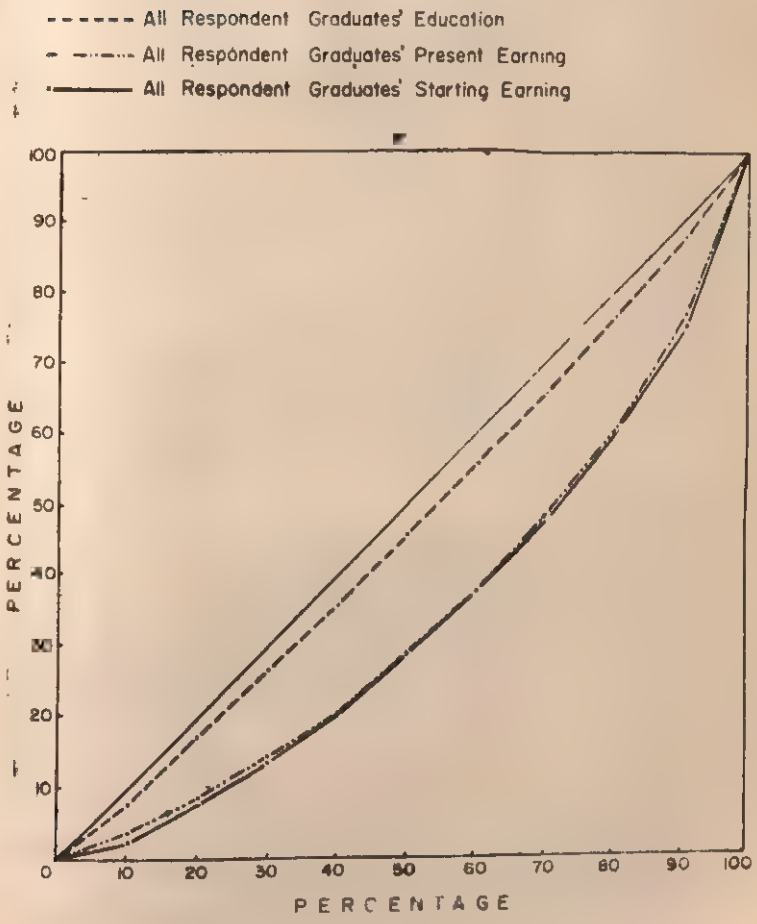

Unaided Graduates' Education
Unaided Graduates' Present Earning
Unaided Graduates' Starting Earning
PERCENTAGE
0
10
20
30
40
50
60
70
80
90
100
PERCENTAGE

FIG. 12


All Respondent Graduates' Education
All Respondent Graduates' Present Earning
All Respondent Graduates' Starting Earning
PERCENTAGE
0
10
20
30
40
50
60
70
80
90
100
PERCENTAGE

Schooling and Earnings with Respect to Employees and Self-employed Persons

The shares of each decile separately and cumulatively in schooling and earnings for respondents, their brothers and sisters and parents classified into employees and self-employed are presented in Tables 4.10, 4.11 and 4.12 respectively. In terms of their share in education, there is nothing to distinguish between employees and self-employed. Marginally, the share of employees seems to be more than self-employed. The share of bottom 50 per cent self-employed and employees respondents is in the range of 45 to 46 per cent, that of brothers and sisters is in the neighbourhood of 41.9 to 42.4 per cent and that of self-employed and employees parents fluctuates around 29.4 to 33 per cent. As against this, the share in present earnings of bottom 50 per cent of *all* categories of employees (i.e., parents, brothers and sisters and respondents) is higher than their counterpart self-employed. The share of top 50 per cent self-employed in earning is higher than top 50 per cent employees. This reveals that the distribution of schooling is closer to the line of perfect equality with respect to both employees and self-employed whereas the distribution of earnings is more away from the line of perfect equality in case of self-employed than in case of employees.

What is of importance is the changes in share in education and earnings of bottom and top 10 per cent inter-generationally. The share of bottom 10 per cent of respondent graduates is the highest; the next lower share is that of respondents' brothers/sisters and lowest is that of their parents, which means that the share of bottom 10 per cent in education has a tendency to increase with the general improvement in educational attainment. Unlike this, the share of top 10 per cent declines. It has declined from 18 per cent in case of parents, whether employed or self-employed, to around 12 to 13 per cent in case of brothers/sisters and remained more or less at that level in case of respondent graduates.

The share in earnings of bottom and top 10 per cent of persons, whether employees or self-employed, follows the pattern that is observed for education. The share of bottom 10 per cent is the lowest with regard to parents whose mean education is also lowest (10.5 years). Respondents' brothers/sisters', with 14.1 years of mean education and belonging to bottom 10 per cent, share is higher, the highest share is that of respondents' themselves with

16.8 years of mean schooling. Thus, with the increase in the share in education of bottom 10 per cent the share in earnings also increases and that of top 10 per cent declines. The share in education and earnings of bottom 10 per cent employees is larger than the share of corresponding self-employed. In contrast, the share of *top* 10 per cent self-employed parents, brothers and sisters and respondents in earnings, whether starting or present, is higher than not only that of top 10 per cent employees but that of bottom 10 per cent self-employed indicating a larger income inequality. So, earnings inequality is more pronounced among self-employed than employees.

The proportion of self-employed has declined between generations. As against 50 per cent self-employed parents, only around one-fifth to one-fourth of their children are self-employed. The numerical importance of employees is on the increase. The mere fact of increasing significance of employees gives a new dimension to the problem of distribution of personal income. Not only the share of bottom 50 per cent of employees in earnings is highest than the corresponding self-employed but also the share of top 50 per cent whether self-employed or employees has a tendency to decline inter-generationally—i.e., the share of top 50 per cent (employees as well as self-employed) being highest in case of parents and lowest in case of respondents. It is clearly evident from the analysis that the growing proportion of employees with a higher mean education is accompanied by less skewed size distribution of income. The Lorenz curves drawn separately for the three categories of employees and self-employed persons are self-evident (see *Figures 13* to *18*).

Inter-Generational Schooling and Earnings

Mean education of respondents is around 17 years, that of their brothers and sisters is 14.1 years and parents is 10.5 years respectively. Mean age of respondents and their brothers/sisters is around 32 years whereas that of their parents is 57 years. What can be said about the distribution of education and present earnings in their cases ? The positions of the three education and present earnings curves each of respondents, their brothers and sisters and parents in that order (given in Figures 19 and 20) show that as the general educational attainment improves, the tendency for the present earnings curve is to move towards the line of per-

FIG. 13

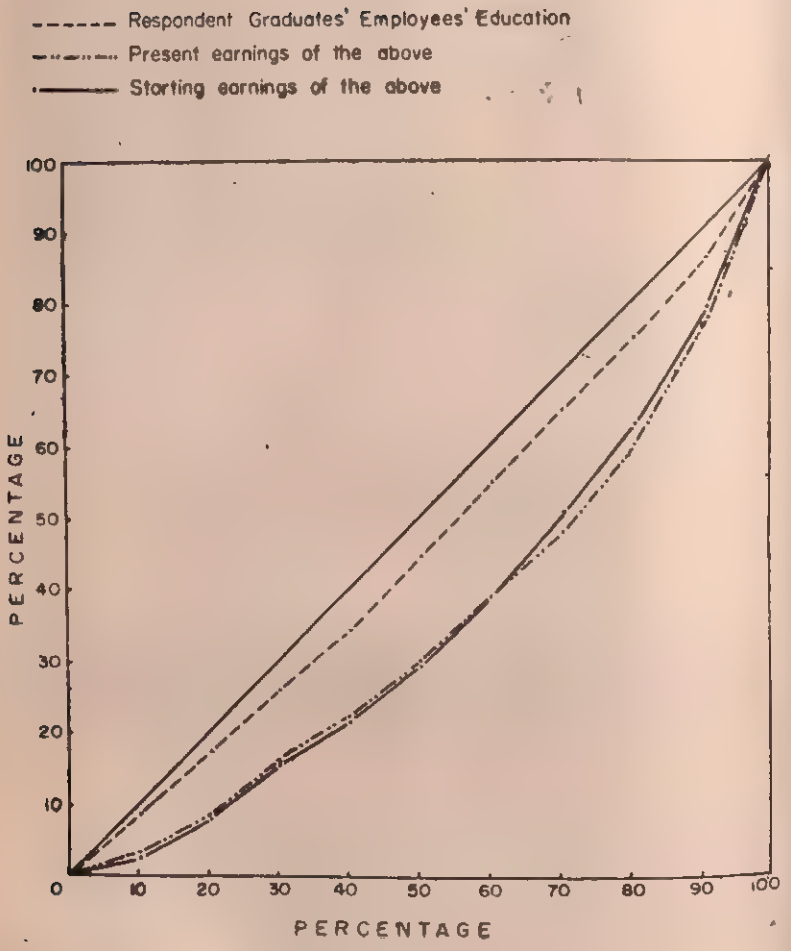

Respondent Graduates' Employees' Education
Present earnings of the above
Starting earnings of the above
PERCENTAGE
PERCENTAGE
0
10
20
30
40
50
60
70
80
90
100

FIG. 14

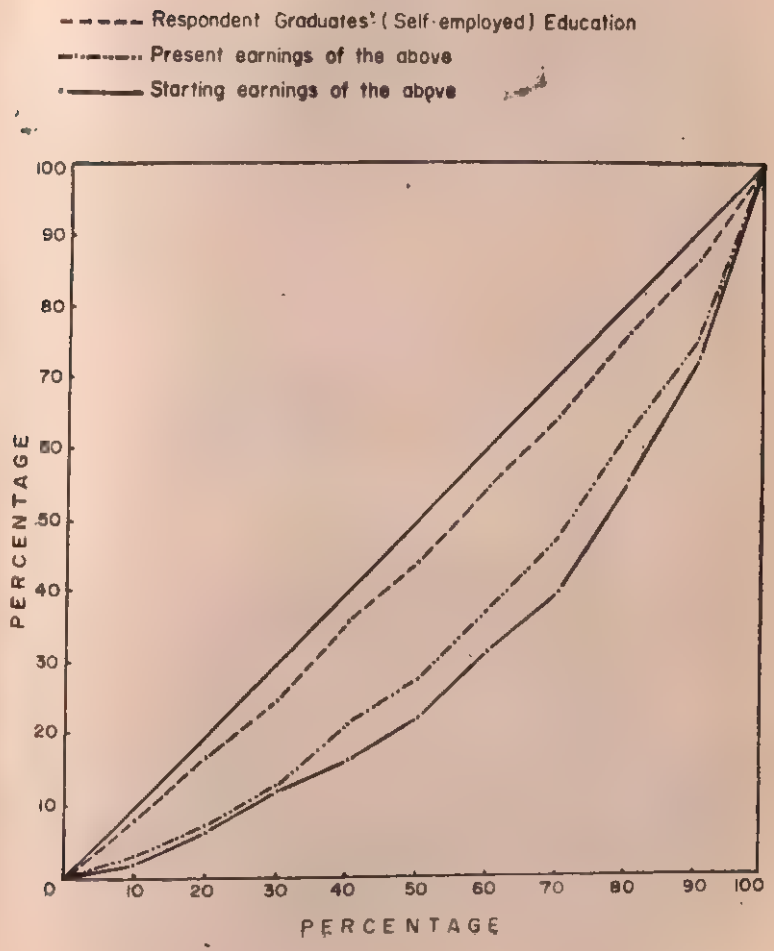
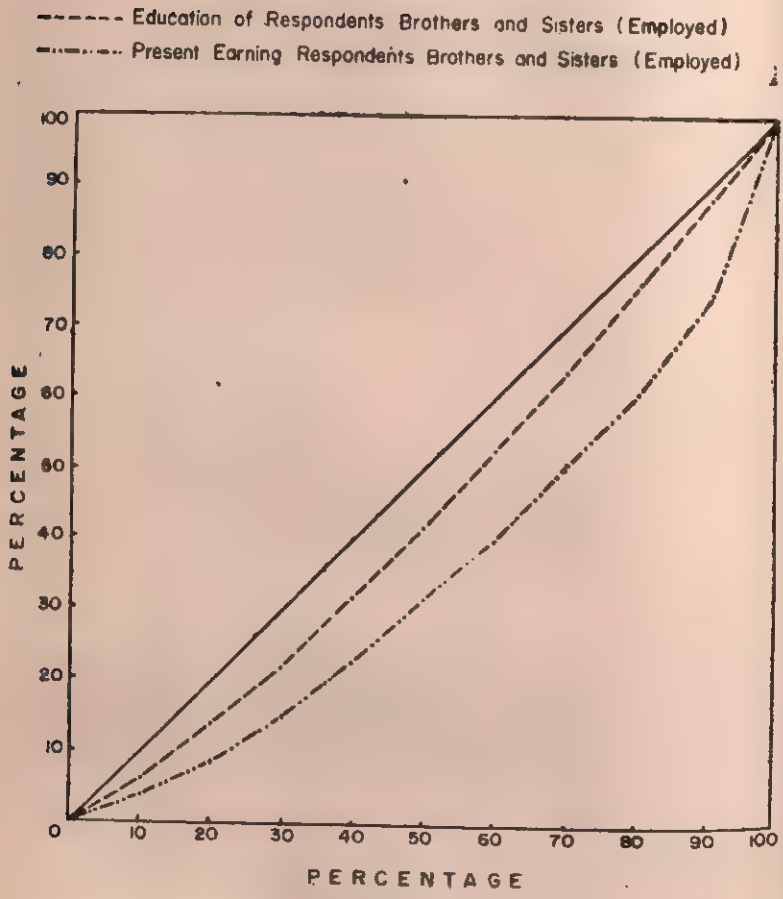

Respondent Graduates' (Self-employed) Education
Present earnings of the above
Starting earnings of the above
PERCENTAGE
PERCENTAGE
0
10
20
30
40
50
60
70
80
90
100

FIG. 15


Education of Respondents Brothers and Sisters (Employed)
Present Earning Respondents Brothers and Sisters (Employed)
PERCENTAGE
0
10
20
30
40
50
60
70
80
90
100
PERCENTAGE

FIG, 16

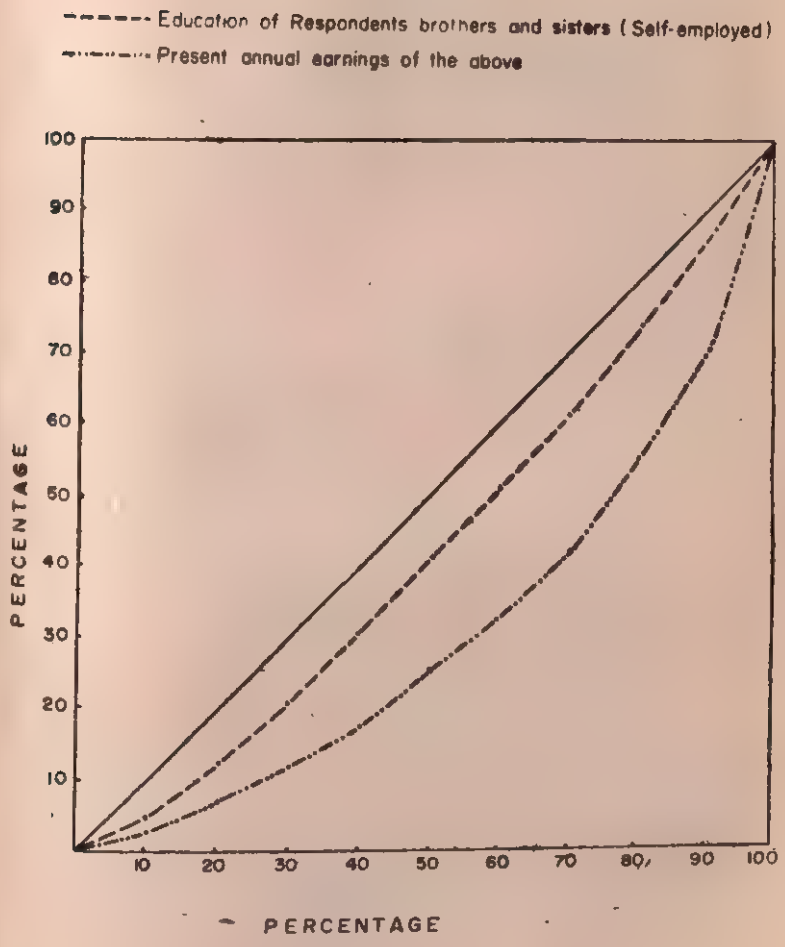

Education of Respondents brothers and sisters (Self-employed)
Present annual earnings of the above
PERCENTAGE
100
90
80
70
60
50
40
30
20
10
10
20
30
40
50
60
70
80
90
100
PERCENTAGE

FIG. 17

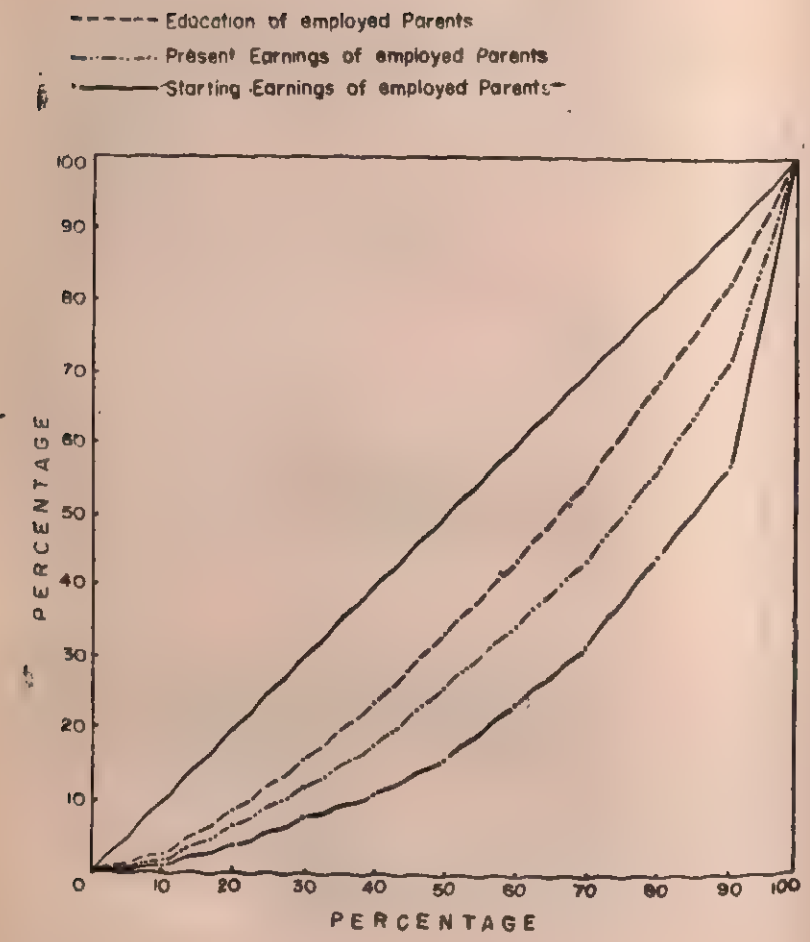

Education of employed Parents
Present Earnings of employed Parents
Starting Earnings of employed Parents
PERCENTAGE
PERCENTAGE
0
10
20
30
40
50
60
70
80
90
100

FIG. 18

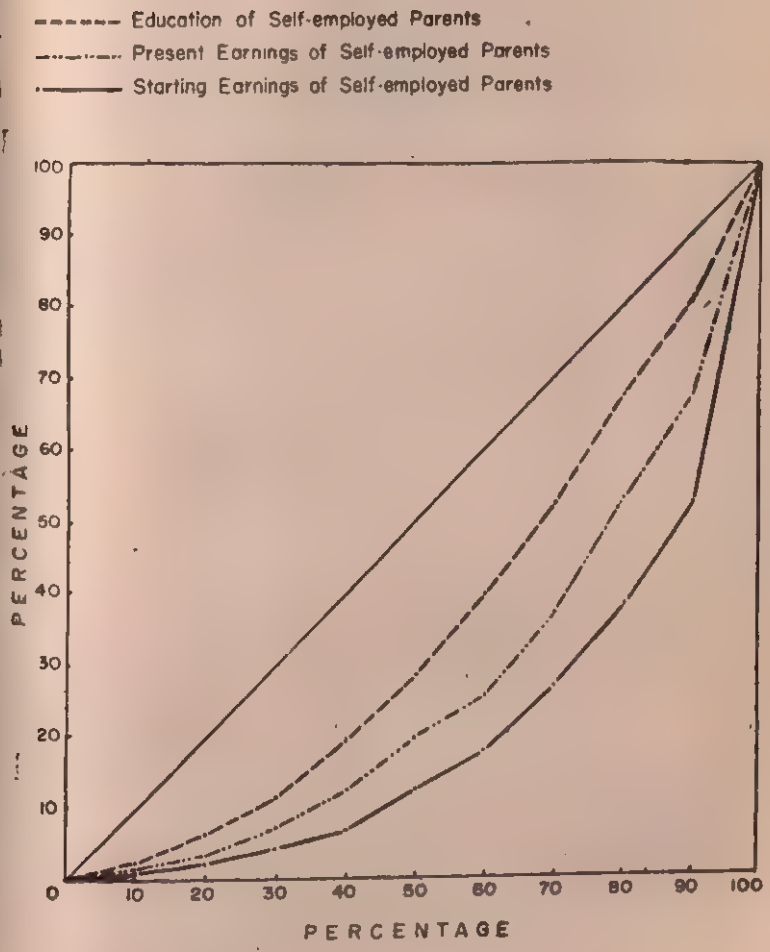

Education of Self-employed Parents
Present Earnings of Self-employed Parents
Starting Earnings of Self-employed Parents
PERCENTAGE
PERCENTAGE
0
10
20
30
40
50
60
70
80
90
100

FIG. 19

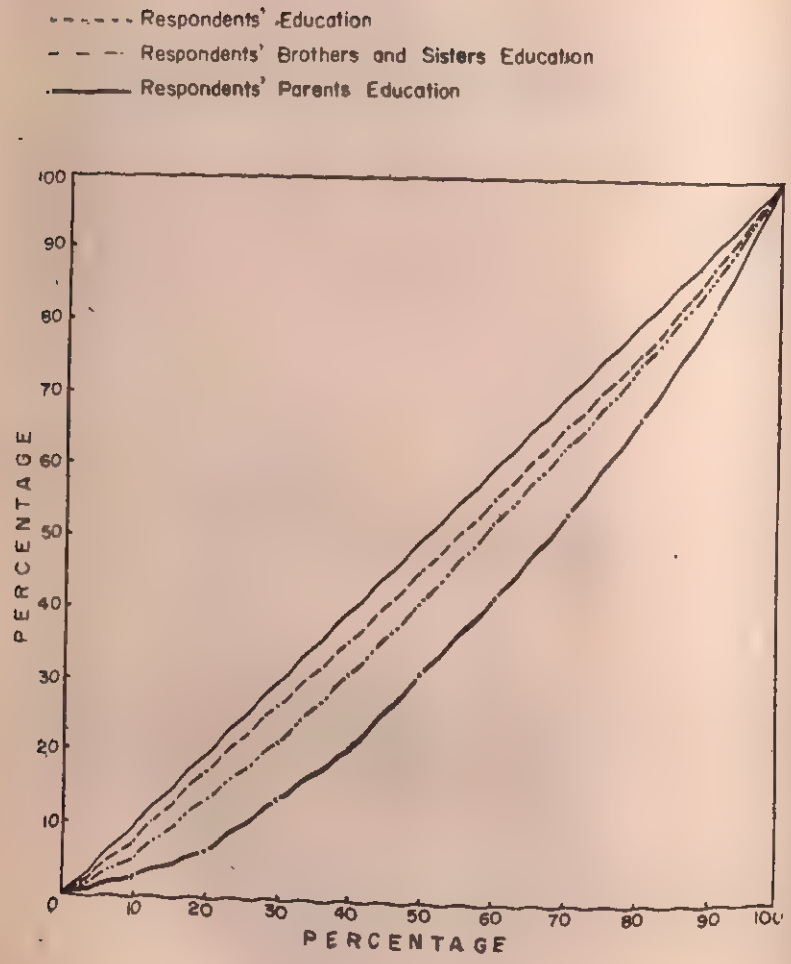
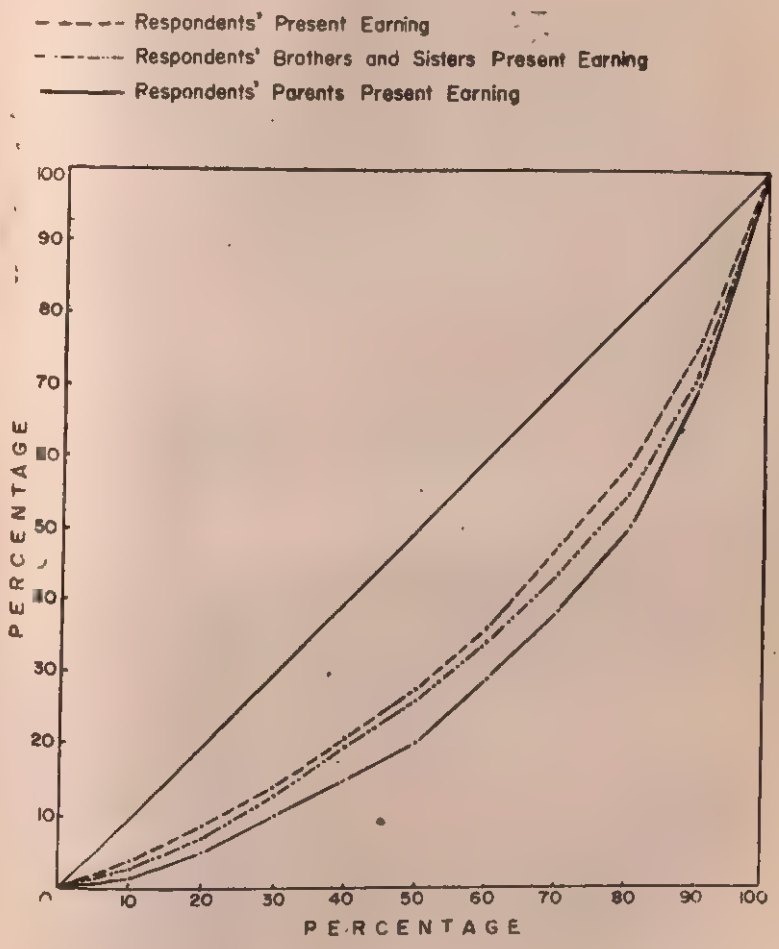

Respondents' Education
Respondents' Brothers and Sisters Education
Respondents' Parents Education
PERCENTAGE
PERCENTAGE
0
10
20
30
40
50
60
70
80
90
100

FIG. 20


Respondents' Present Earning
Respondents' Brothers and Sisters Present Earning
Respondents' Parents Present Earning
PERCENTAGE
PERCENTAGE
0
10
20
30
40
50
60
70
80
90
100

fect equality suggesting a better personal income distribution. This finding also supports the hypothesis that with the improvement in average educational attainment of the labour force (10, 14 and 17 years of education in our case) and a relatively higher proportion of the labour force constituting younger persons (children vs. parents), the tendency for the size distribution of income is to improve (see Table 4.13).

In this way, over time if the tendency of the labour force is towards (a) higher mean education, (b) reduced proportion of self-employed and (c) higher proportion of younger persons in the labour force, the personal income distribution tends to be less skewed both horizontally (i.e., reduced share of top 10 per cent employees as well self-employed) and vertically (i.e., reduced disparity between bottom 10 and 50 and top 10 and 50 per cent). Inter-generationally also personal distribution of income seems to have become less skewed.

What do the Gini coefficients have to say about schooling and earnings inequalities? The relevant coefficients are given in Table 4.14. Gini coefficient for education has consistently fallen from 0.0775 for 1961 graduates to 0.0480 for 1975 graduates, implying a reduction in schooling inequality. How has the reduced schooling inequality influenced earnings inequality? Since a less discriminatory growth of human capital influences income distribution in the long run, it is better to compare Gini coefficients for starting and present earnings for the four bench-mark year graduates. Except for 1965 graduates, both with respect to 1961 and 1970 graduates the corresponding coefficients have fallen whereas for 1975 graduates the coefficients have remained virtually unchanged. Thus Gini coefficients for present earnings are lower than those for starting earning, conveying a better inter-temporal income distribution.

At the outset we would like to forewarn ourselves about the differences in sample size for each of the classes. However, between these four classes, 'B.C.' and 'Unaided' belong to two distinct classes—namely, socially backward and social elite. The other two, 'E.B.C.' and 'Aided', may be said to be in a state of flux in the sense that there may be some vertical movement. Therefore, we feel the distinction between the B.C. and Unaided is meaningful and useful, though we give below the Gini coefficient for all classes. The Gini coefficient for the B.C. is lowest. The unaided

group shows a high enough Gini coefficient. For the same two classes the coefficients for starting and present earnings show a remarkable support for our hypotheses. For both B.C. and Unaided the earnings inequalities have narrowed over the period. For the other two groups, the inequality has slightly altered upwards. It is for this reason that the figures for these two groups —E.B.C. and Aided—must be critically viewed. A further study on market imperfections and expansion and diversification of economic opportunities may throw light on this aspect. We conjecture that education still has helped the E.B.C. and aided as a countervailing force in the prevailing unfavourable labour market. The high percentage of self-employed amongst the Unaided and the total absence of it amongst the B.C. in conjunction with preference for B.C. in the public sector and the economic advantages of the Unaided would explain and reinforce the role of education in bringing down inequalities.

Gini coefficients, given in Table 4.15, of education and present earnings of employees and self-employed parents and brothers/sisters suggest that income inequality is more pronounced than inequality of education and both education and income are more unevenly distributed among self-employed *per se* than employees. They also show that the extent of inequality, both schooling and earning, is high for parents who are older and have lower mean years of schooling than for their children who are younger and have higher mean years of education. The relevant coefficients are: 0.258 and 0.434 for education and earnings respectively for parents, 0.113 and 0.358 for education and earnings respectively for their children (respondents' brothers/sisters only).

Variance of log of income and education, another measure of inequality, further confirms the tendency towards narrowing income inequality inter-temporally. For example, variance of log of education in case of parents is 3.576 as against that of 1.916 with respect to their children (respondents' brothers/sisters) whereas variance of log of income with respect to parents is 6.198 as against that of 3.984 with respect to their children (see Table 4.16).

Educational inequality and income inequality seem to move more or less in consonance, i.e., income inequality declines with the reduction in schooling inequality—both are given by coefficient of variations of log of education and earning. This is more perceptible with respect to B.C., E.B.C. and aided graduates—the

recipients of 'specific' subsidy. In the case of 'unaided' though the coefficient of variation of log of education of 0.033 (see Table 4.17) is lower than that of 0.040 for 'aided', the income inequality is slightly more. This might be not on account of a particular system of financing higher education, but because of elements like self-employment among them and property or wealth possessed by them. Furthermore, unlike the first three categories, the 'unaided' category by nature is a 'heterogeneous' group—socially as well as economically.

Schooling and earnings inequalities for graduates of four bench-mark years reveal that the educational inequality can be reduced by fiscal measures, but their effect on income inequality is in the long-run, i.e., though education inequality has declined consistently, income inequality has not. Comparing 1961 or 1965 coefficients of variation both of education (log) and earning (log) with those of 1975, it can be inferred that over a 10 or 15 year period the reduction in schooling inequality has brought down earnings inequality. It turns out to be a different story when 1961 or 1970 coefficients are compared with those of 1965 and 1975 (see Table 4.17). Variance of education and earnings given in Table 4.18 tells a similar story.

The coefficient of dispersion for respondents (all graduates), their brothers/sisters and parents (graduates + undergraduates) shows a larger dispersion in earnings going with a larger dispersion in schooling (see Table 4.19). Similar coefficients separately for graduates and undergraduates not only confirm what has been said above, but further reveal higher inequalities both of schooling and earnings for undergraduates relative to graduates. They affirm the earlier observed tendency that both schooling and income inequalities have diminished inter-temporally.

All these evidences conclusively prove that there is a tendency towards narrowing of earnings inequality as a result of less discrimination of human capital. However, the tendency is woefully slow as can be seen from the share of bottom 50 per cent of persons in present earnings which is not even 10 per cent.

V

CONCLUDING OBSERVATIONS

Private costs of education are 'investments' in education

already incurred. They are, thus, treated as at one point of time when education is completed. Private human capital formed has increased nearly by two times in real terms. The declining investment per unit of output in real terms is suggestive of higher private efficiency of education.

The 'pattern' of earnings profiles computed by extrapolating the earnings on the basis of various regression equations, on the whole, is in tune with the predictions of human capital theory. For example, higher average annual rates of growth of earnings are found to be associated with more investment in schooling.

Taking the level of educational attainment as given, the variation in earnings is explained either by the variation in age and/or experience.

On the other hand, the 'pure' effect of education on earnings is no less significant as revealed by higher mean earnings of respondent graduates though they are younger in age and with half the experience than that of 'all' persons.

In terms of our classification of graduates, namely, B.C., E.B.C., Aided and Unaided, the rate of return enrolment interactions confirm optimising (maximising) behaviour with regard to investment in education.

Incremental returns to years of schooling show a tendency to diminish after reaching a maximum.

Returns to investment in education are inversely related to levels of education.

Education in general has a favourable impact on equalising incomes. Subsidy has augmented education of the hitherto deprived which has brought out greater equality of education. With the diminished inequality of education there is an associated diminished inequality in earnings between generations. This conforms more to the 'wage competition model' than to the 'screening model' (job competition model).

Earnings inequality seem to be more pronounced than schooling inequality. Though both inequalities have compressed, the reduction in earnings inequality lacks consistency implying thereby that inequality in schooling can be reduced by fiscal measures, but their effect on income inequality is in the long-run.

Various measures of inequalities such as Gini coefficient, coefficient of dispersion and variance show greater inequalities in schooling and earnings when mean education of persons is low,

when they are old and when the proportion of self-employed is high. With the changing characteristics of the labour force, as the Indian economy has been witnessing during economic planning, namely, higher mean education, higher proportion of younger persons and declining proportion of self-employed, the distribution of schooling and income has become less skewed. However, the tendency towards better size distributon of income is very slow and not consistent, suggesting thereby the weaknesses of the wage competition model. Even then, it should not be interpreted as denying positive role to the financing of education in altering income distribution favourably. It is, on the contrary, heartening to note that unlike regressive tax system or price inflation, education has not furthered inequalities as claimed by others.

TABLE 4.1

Cost of Education and Human Capital Formation

Year	*Average private costs (Investment) (Rs.)*	*Output of Graduates (M.S. University)*	*Private Human Capital Formation (current prices) (Rs. in crores) (2×3)*	*Consumer Price Index (1961 = 100)*	*Private Human Capital Formation in Real Terms (Rs. in crores)*	*Index of Private Human Capital Formation*		*Investment per unit of output in Real Terms (Rs.)*
						Current Prices	*Real prices*	
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
1961	8,508	1,384	1.18	100.00	1.18	100.00	100.00	8,508
1965	10,528	2.306	2.43	126.5	1.92	205.90	162.71	8,326
	(23.74)	(66.62)	(10.59)		(62.7)			
1970	13,525	2,886	3.90	171.6	2.27	330.50	192.37	7,866
	(28.47)	(25.15)	(60.49)		(18.23)			
1975	24,657	3,855	9.50	295.1	3.22	805.10	272.88	8,353
	(82.31)	(33.58)	(143.60)		(41.35)			

TABLE 4.2

Mean Present Earnings, Mean Age, Mean Education and Mean Experience

Category of persons	*Mean Present Earnings*	*Mean Age*	*Mean Education*	*Mean Experience*
1	*2*	*3*	*4*	*5*
Respondents				
B.C.	8078	29.0	15.8	5.2
E.B.C.	10852	29.8	16.0	7.4
Aided	11822	32.2	17.1	7.8
Unaided	14065	33.6	16.98	10.1
1961	19645	42.7	18.3	18.4
1965	17336	36.6	16.9	13.0
1970	10532	33.2	16.8	8.6
1975	9802	28.2	16.5	5.3
Respondents' Brothers & Sisters	9526	32.2	14.1	11.1
All persons	11760	37.4	14.5	15.4
Respondents themselves	12429	32.3	16.8	8.6
Parents	11109	56.0	10.5	36.0

TABLE 4.3

Linear Increase in Life-time Earnings: Average Annual

(*In percentages*)

Category of Persons	*First Quinquennium*	*First Decade*	*Second Decade*	*7/8 Years*	*Last Quinquennium*
1	*2*	*3*	*4*	*5*	*6*
Respondents					
B.C.	2.24	2.52	2.01	1.41	0.99
E.B.C.	5.67	4.71	3.09	2.27	1.66
Aided	17.87	9.50	4.62	2.91	2.19
Unaided	3.44	3.18	2.35	1.78	1.45
1961	6.10	4.97	3.20	1.97	1.77
1965	9.99	8.37	4.34	2.85	2.06
1970	1.37	1.42	1.22	1.03	0.88
1975	1.72	1.75	1.46	1.22	1.01
Respondents' Brothers & sisters	2.45	2.39	1.89	1.56	1.18
All persons	2.24	2.21	1.68	1.45	1.26
Respondents themselves	6.62	5.27	3.32	2.33	1.81
Parents	1.52	1.68	1.42	1.22	0.99

TABLE 4.4

Private Returns to Education (Linear Average per year)

Category of Graduates	*Private costs (Rs.)*	*Present value of Life-time earnings (Rs.)*	*Rate of Return (%)*
1	*2*	*3*	*4*
Socio-economic Group			
B.C. (15.88)	13,215	86,733	18.23 (17.87)
E.B.C. (16.00)	15,771	99,636	16.62 (16.29)
Aided (17.08)	19,394	88,408	12.66 (12.41)
Unaided (16.98)	23.400	1,44,492	13.59 (13.32)
Bench-mark years			
1961 (18.3)	8.508	97,882	31.94 (31.32)
1965 (16.9)	10,528	83,662	21.22 (21.08)
1970 (16.8)	13,525	99,039	20.34 (19.93)
1975 (16.5)	24,657	90,444	9.91 (9.71)

Notes: 1. Figures in parentheses in Col. 1 are mean education.
2. Figures in parentheses in Col. 4 are adjusted rates of return—adjusted for unemployment rate and economic growth.

TABLE 4.5

Private Returns to Education (Linear average per year)

Category of persons	*Private costs (Rs.)*	*Present value of earnings (Rs.)*	*Rate of return*	*Coefficient of Variation (C.V.) log*	
				Education	*log Earnings*
1	*2*	*3*	*4*	*5*	*6*
Parents (10.5)	1,233	19,552*	40.00	0.459	0.087
Brothers/Sisters (14.1)	9,886	88,601	22.88 (22.57)	0.211	0.067
All (14.6)	11,529	1,00,479	22.93 (22.48)	—	—
Graduate respondents (16.8)	17,945	1,03,943	15.86 (15.77)	0.108	0.059

Note: *Present value of parents' earnings is obtained in this manner. From our respondents we have collected information about their parents' earnings at four different time periods almost covering their entire life-time—starting earning (around 1942-43), earnings in 1961, earnings when their children were studying and present earnings. Life-time earnings are estimated by applying the average annual rates of earnings given by the regression equation to these earnings at four intervals of time.

1. Figures in parentheses in Col. 4 are adjusted rates of return—adjusted for unemployment rate and economic growth.
2. Figures in parentheses in Col. 1 are mean education.

TABLE 4.6
Private Incremental Returns

Category of Persons	*Incremental Returns (+ or —)*
1	*2*
Graduates	
E.B.C./B.C.	+ 13.28
Aided/B.C.	+ 0.75
Unaided/B.C.	+ 7.57
1965/61	— 20.36
1970/61	+ 9.64
1975/61	— 1.24
1965/61	— 20.36
1970/65	+ 15.18
1975/70	— 2.09

TABLE 4.7
Private Incremental Returns

Category of persons	*Incremental Returns (+ or —)*	*Additional Schooling (in years)*
1	*2*	*3*
Brothers/ sisters (14.1)	/Parents /(10.5)	+ 20.3	3.6
All persons (14.5)	Parents' (10.5)	+ 20.7	4.0
Graduates (16.8)	Parents (10.5)	+ 14.0	6.3
Graduates (16.8)	Brothers sisters (14.1)	+ 5.5	2.7
Graduates (16.8)	All persons (14.5)	+ 1.5	2.3

Note: Figures in parentheses are mean education of each category of persons.

TABLE 4.8

Separate and Cumulative Share of Respondents of Bench-mark Years in Education, Starting and Present Earnings

(*In Percentages*)

Share of Lowest (%)	*1961 Graduates*			*1965 Graduates*			*1970 Graduates*			*1975 Graduates*		
	1961 Respondents' education	*Starting earning*	*Present earning*	*1965 Respondents' education*	*Starting earning*	*Present earning*	*1970 Respondents' education*	*Starting earning*	*Present earning*	*1975 Respondents' education*	*Starting earning*	*Present earning*
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*
10	7.95	3.37	3.02	9.15	4.70	4.27	9.34	3.39	5.63	9.34	4.27	4.48
20	7.95	3.88	5.02	9.15	5.44	5.09	7.79	4.38	5.63	8.56	5.03	5.45
30	8.66	4.91	7.50	9.35	6.11	5.81	9.66	6.12	7.90	9.34	6.85	6.59
40	9.01	5.49	7.17	9.76	7.38	6.55	9.97	7.56	8.68	9.86	8.80	6.69
50	9.01	8.34	9.47	6.91	8.99	5.12	8.72	8.27	7.43	9.13	7.92	7.97
60	12.72	7.36	10.02	10.36	6.04	8.74	10.59	7.79	9.38	9.96	10.04	9.15
70	10.24	8.73	10.36	10.97	8.74	10.24	10.90	10.28	10.44	10.59	10.90	0.92
80	11.14	11.23	15.38	19.97	11.66	10.95	11.22	12.11	13.98	10.69	12.14	13.06
90	11.66	16.19	13.59	10.97	15.99	12.13	9.51	12.65	10.66	10.28	12.79	15.11
100	11.66	30.50	18.47	12.41	23.90	31.10	12.25	27.45	20.27	12.25	22.26	21.58

(Contd.)

TABLE 4.8 (Contd.)

Share of Lowest (%)	1961 Graduates			1965 Graduates			1970 Graduates			1975 Graduates		
	1961 Respondents' education	Starting earning	Present aerning	1965 Respondents' education	Starting earning	Present earning	1970 Respondents' education	Starting earning	Present earning	1975 Respondents' education	Starting earning	Present earning
1	14	15	16	17	18	19	20	21	22	23	24	25
10	7.95	3.37	3.02	9.15	4.70	4.27	9.34	3.39	5.63	9.34	4.27	4.33
20	15.90	7.25	8.04	18.30	10.14	9.36	17.13	7.77	11.26	17.90	9.30	9.68
30	24.56	12.16	15.53	27.65	16.25	15.17	26.79	13.88	19.15	27.24	16.16	16.21
40	33.57	17.65	22.70	37.41	23.65	21.72	36.76	21.44	27.84	37.10	23.96	23.41
50	42.58	26.00	32.18	44.32	32.62	26.84	45.48	29.72	35.27	46.23	31.87	31.27
60	55.30	33.36	42.19	54.68	38.66	35.58	56.07	37.51	44.66	56.19	41.91	40.27
70	65.54	42.08	53.56	65.65	48.45	45.81	66.97	47.79	55.08	66.78	52.81	50.89
80	76.68	53.32	67.94	76.62	60.11	56.77	78.19	59.90	69.07	77.47	64.95	63.79
90	88.34	69.50	71.53	87.59	76.10	69.90	87.75	72.55	79.73	87.75	77.74	78.81
100	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

TABLE 4.9

Separate and Cumulative Share of Respondents of Different Categories in Education, Starting and Present Earnings

(In Percentages)

Share of Category	*B.C.*			*E.B.C.*			*Aided*		
	Education	*Starting earning*	*Present earning*	*Education*	*Starting earning*	*Present earning*	*Education*	*Starting earning*	*Present earning*
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
10	7.81	4.74	6.97	11.11	2.99	3.37	8.78	2.67	3.83
20	11.72	2.76	4.22	5.56	6.17	6.61	8.79	4.16	5.29
30	7.81	6.66	9.54	10.61	5.23	5.51	8.97	6.21	6.09
40	11.72	9.00	9.65	11.61	9.37	8.47	9.37	7.76	7.50
50	7.81	5.50	4.91	5.55	7.63	6.92	9.70	8.93	8.30
60	5.34	12.10	10.58	11.11	8.27	7.25	9.95	10.04	9.00
70	15.50	13.10	11.28	11.86	13.12	12.5	10.15	11.50	9.90
80	8.85	14.60	12.84	12.59	10.18	10.9	10.54	12.90	11.69
90	13.80	7.80	8.77	6.67	19.22	20.7	11.19	14.60	15.60
100	9.64	23.70	21.22	13.33	17.82	17.70	12.56	21.20	22.80

(Contd. in width)

TABLE 4.9 (Contd.)

Share of Lowest (%)	*Unaided*			*All*		
	Education	*Starting earning*	*Present earning*	*Education*	*Starting earning*	*Present earning*
1	*11*	*12*	*13*	*14*	*15*	*16*
10	8.75	3.45	3.30	8.83	3.43	3.64
20	8.80	4.58	4.40	8.83	4.85	5.00
30	9.33	5.47	5.90	9.35	5.99	6.00
40	9.33	6.34	6.40	9.42	7.02	6.83
50	9.26	7.09	7.40	9.45	7.92	7.64
60	11.21	9.02	7.80	10.01	9.00	8.71
70	10.80	9.70	10.70	10.01	10.34	9.88
80	10.50	11.20	14.50	11.06	12.32	13.40
90	10.73	16.60	17.00	10.83	14.32	16.00
100	12.01	26.55	22.60	12.21	24.81	22.89

(Contd. in width)

TABLE 4.9 (Contd.)

Share of Lowest (%)	*B.C.*			*E.B.C.*			*Aided*		
	Education	*Starting earning*	*Present earning*	*Education*	*Starting earning*	*Present earning*	*Education*	*Starting earning*	*Present earning*
1	*17*	*18*	*19*	*20*	*21*	*22*	*23*	*24*	*25*
10	7.81	4.74	6.97	11.11	2.99	3.37	8.78	2.67	3.83
20	19.53	7.50	11.19	16.67	9.16	9.98	17.57	6.83	9.12
30	27.34	14.20	20.74	27.28	14.38	15.50	26.54	13.00	15.21
40	39.06	23.20	30.38	38.89	23.77	24.00	35.91	20.80	22.71
50	46.87	24.70	35.30	44.44	31.40	30.90	45.61	29.70	31.01
60	52.21	40.80	45.88	55.5	39.68	38.10	55.56	39.70	40.00
70	67.71	52.90	57.16	67.41	52.78	50.60	65.71	51.30	49.90
80	76.56	68.50	70.00	80.00	62.97	61.50	76.25	63.20	61.60
90	90.36	76.30	78.78	86.67	82.18	82.30	87.44	78.80	77.20
100	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

(Contd.)

TABLE 4.9 (Contd.)

Share of Lowest (%)	*Unaided*			*All*		
	Education	*Starting earning*	*Present earning*	*Education*	*Starting earning*	*Present earning*
1	*26*	*27*	*28*	*29*	*30*	*31*
10	8.75	3.45	3.30	8.83	3.43	3.64
20	17.55	8.04	7.70	17.66	8.28	8.64
30	26.88	13.60	13.60	27.01	14.27	14.65
40	36.21	19.80	20.00	36.43	21.29	21.48
50	45.77	26.90	27.40	45.88	29.21	29.12
60	56.68	35.90	35.20	55.89	38.21	37.84
70	66.76	45.60	45.90	65.90	48.55	47.72
80	77.26	56.80	60.40	76.96	60.87	61.11
90	87.99	73.50	77.40	87.79	75.19	77.11
100	100.00	100.00	100.00	100.00	100.00	100.00

TABLE 4.10

Separate and Cumulative Share of Respondents in Education, Starting and Present Earnings by Category: Employees and Self-employed

(In Percentages)

Share of Lowest (%)	*Respondents' Education*		*Respondents' Starting Earnings*		*Respondents' Present Earnings*	
	Employees	*Self-employed*	*Employees*	*Self-employed*	*Employees*	*Self-employed*
1	*2*	*3*	*4*	*5*	*6*	*7*
10	9.06	7.70	3.80	2.43	3.91	3.10
20	9.06	9.76	5.18	4.30	5.46	4.69
30	8.58	8.21	6.12	3.45	5.86	5.07
40	9.63	10.52	7.70	6.24	7.08	8.40
50	9.67	8.73	8.78	5.89	8.52	7.08
60	10.08	11.04	9.75	8.79	8.38	9.88
70	10.27	9.24	11.19	9.64	10.03	9.87
80	10.14	11.81	12.01	15.43	11.98	14.30
90	10.92	9.76	14.17	16.92	16.39	14.15
100	12.59	13.22	21.30	26.89	22.39	23.45

(Contd. in width)

TABLE 4.10 (Contd.)

(*In Percentages*)

Share of Lowest (%)	*Respondents' Education*		*Respondents' Starting Earnings*		*Respondents' Present Earnings*	
	Employees	*Self-employed*	*Employees*	*Self-employed*	*Employees*	*Self-employed*
1	*8*	*9*	*10*	*11*	*12*	*13*
10	9.06	7.70	3.80	2.43	3.91	3.10
20	18.12	17.46	8.98	6.73	9.37	7.79
30	26.70	25.67	15.10	10.18	15.23	12.86
40	36.33	36.20	22.80	16.42	22.31	21.26
50	46.00	44.93	31.58	22.31	30.83	28.34
60	56.09	55.97	41.33	31.10	39.21	38.22
70	66.35	65.21	52.52	40.74	49.24	48.09
80	76.49	77.02	64.53	56.17	61.22	62.39
90	87.41	87.78	78.70	73.09	77.61	76.54
100	100.00	100.00	100.00	100.00	100.00	100.00

TABLE 4.11

Separate and Cumulative Share of Respondents' Brothers and Sisters in Education and Present Earnings by Category: Employees and Self-Employed

(In Percentages)

Share of Lowest (%)	*Respondents' Brothers and Sisters' Education*			*Respondents' Brothers and Sisters Present Earning*		
	Employees	*Self-employed*	*All*	*Employees*	*Self-employed*	*All*
1	*2*	*3*	*4*	*5*	*6*	*7*
10	5.79	5.90	5.8	3.65	2.97	3.12
20	8.25	7.64	8.08	5.16	3.60	4.70
30	7.95	7.99	7.96	6.61	4,49	5.72
40	9.87	9.95	9.83	7.81	5.27	6.64
50	10.54	10.42	10.57	8.28	6.88	7.08
60	10.62	10.42	10.57	8.72	8.31	7.78
70	11.24	10.76	11.06	10.28	10.45	9.19
80	11.24	11.57	11.27	10.85	12.08	19.78
90	12.33	12.38	12.31	14.14	15.43	15.75
100	12.16	12.07	12.53	25.50	30.43	29.21

(Contd. in width)

TABLE 4.11 (Contd.)

(*In Percentages*)

Share of Lowest (%)	*Respondents' Brothers and Sisters Education*			*Respondents' Brothers and Sisters Present Earnings*		
	Employees	*Self-employed*	*All*	*Employees*	*Self-employed*	*All*
1	*8*	*9*	*10*	*11*	*12*	*13*
10	5.79	5.90	5.82	3.65	2.97	3.12
20	14.03	13.54	13.90	8.81	6.66	7.83
30	21.99	21.53	21.87	15.42	11.14	13.55
40	31.86	31.48	31.70	23.23	16.41	20.20
50	42.40	41.90	42.27	31.51	23.29	27.28
60	53.02	52.32	52.83	40.23	31.60	35.06
70	64.26	63.08	63.89	50.51	42.05	44.25
80	75.51	74.65	75.16	61.36	54.13	55.03
90	87.84	87.03	87.47	75.50	69.56	70.79
100	100.00	100.00	100.00	100.00	100.00	100.00

TABLE 4.12

Separate and Cumulative share of Respondents' Parents in Education, Starting Earnings by Category: Employees and Self-employed

Share of Lowest (%)	*Parents' Education*			*Parents' Starting Earnings*			*Parents' Present Earnings*		
	Employees	*Self-employed*	*All*	*Employees*	*Self-employed*	*All*	*Employees*	*Self-employed*	*All*
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
10	3.32	2.97	2.73	2.20	1.05	1.31	2.89	1.62	1.87
20	5.21	3.22	4.70	2.48	1.49	2.20	3.65	2.31	3.34
30	7.74	5.76	6.49	3.41	2.56	2.58	5.82	4.10	4.38
40	7.42	7.81	7.43	3.34	3.35	3.25	5.86	5.16	5.37
50	10.27	9.11	9.56	5.05	4.38	4.20	8.10	6.20	5.55
60	10.43	10.22	11.27	7.06	5.08	6.44	9.13	6.32	8.04
70	10.74	12.82	11.53	8.28	9.03	8.05	8.78	11.21	8.99
80	14.22	15.43	13.58	12.29	11.30	10.55	12.73	15.69	12.94
90	12.32	13.76	15.71	13.25	14.51	16.96	15.43	14.82	20.10
100	18.33	18.40	17.00	42.64	47.25	44.46	27.61	32.57	29.42

(Contd.in width)

TABLE 4.12 (Contd.)

(In Percentages)

Share of Lowest (%)	*Parents' Education*			*Parents' Starting Earnings*			*Parents' Present Earnings*		
	Employees	*Self-employed*	*All*	*Employees*	*Self-employed*	*All*	*Employees*	*Self-employed*	*All*
1	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*	*19*
10	3.32	2.97	2.73	2.20	1.05	1.31	2.89	1.62	1.87
20	8.53	6.69	7.43	4.68	2.54	3.51	6.64	3.93	5.21
30	16.27	12.45	13.92	8.09	5.10	6.09	12.16	8.03	9.59
40	23.69	20.26	21.35	11.43	8.45	9.34	18.22	13.19	14.96
50	33.96	29.37	30.91	16.48	12.83	13.54	26.32	19.51	20.51
60	44.39	39.59	42.18	23.54	17.91	19.98	35.45	25.71	28.55
70	55.13	52.41	53.71	31.82	26.94	28.03	44.23	36.92	37.54
80	69.35	67.84	67.29	44.11	38.24	38.58	56.96	52.61	50.48
90	81.67	81.60	83.00	57.36	52.75	55.54	73.39	67.43	70.58
100	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

TABLE 4.13

Inter-generational Distribution of Schooling and Earnings

Category of Persons	*Mean Education (In years)*	*Mean Age (In years)*	*Share of Bottom 50 per cent in*			*Share of Top 50 per cent in*		
			Education (%)	*Starting earnings* (%)	*Present earnings* (%)	*Education* (%)	*Starting earnings* (%)	*Present earnings* (%)
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
Parents	10.5	57	30.91	13.54	20.51	69.09	86.46	79.49
Brothers/ Sisters	14.1	32	42.27	—	27.28	57.13	—	72.72
Respondents	16.8	32.3	45.88	29.2	29.1	54.12	70.80	70.90

TABLE 4.14

Gini coefficients of Education, Starting and Present Earnings for Respondent Graduates

Category	*Education*	*Present Earnings*	*Starting earnings*
1	*2*	*3*	*4*
1961	0.0775	0.250	0.384
1965	0.0535	0.334	0.294
1970	0.0500	0.211	0.335
1975	0.0480	0.266	0.262
B.C.	0.0375	0.183	0.264
E.B.C.	0.0397	0.275	0.268
Aided	0.0629	0.283	0.273
Unaided	0.0524	0.296	0.339

TABLE 4.15

Gini Coefficients for Employees and Self-employed Categories

Categories of Respondents	*Present Earnings*	*Education*
1	*2*	*3*
Graduates		
Employees	0.2877	0.0555
Self-employed	0.2983	0.0558
Brothers and Sisters		
Employees	0.2329	0.1084
Self-employed	0.3961	0.1187
All	0.358	0.113
Parents		
Employees	0.3523	0.2298
Self-employed	0.4496	0.2787
All	0.434	0.258

TABLE 4.16

Variance of Log of Education and Income

Category of Parents	*Education*	*Income*
1	*3*	*2*
All Respondents	1.023	3.670
Brothers/Sisters	1.916	3.984
Parents	3.576	6.198

TABLE 4.17

Mean, Standard Deviation, Coefficient of Variation of Education, Starting Earnings and Present Earnings : Graduates

Categories of Graduates	*Education*			*Starting Earnings*			*Present Earnings*		
	Mean	*S.D.*	*C.V.*	*Mean*	*S.D.*	*C.V.*	*Mean*	*S.D.*	*C.V.*
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
1961	18.258	2.5556	0.139	3959.7	3302.7	0.824	19645.0	9316.4	0.474
	(2.8952)	(0.1389)	(0.048)	(8.0486)	(0.6499)	(0.081)	(9.7631)	(0.5426)	(0.056)
1965	16.966	1.7214	0.101	4020.0	2418.0	0.601	20602.0	7653.0	0.856
	(2.8264)	(0.0988)	(0.035)	(8.1623)	(0.5115)	(0.063)	(9.7466)	(0.5548)	(0.057)
1970	16.895	1.5548	0.092	4784.5	3289.60	0.687	11452.0	4719.5	0.412
	(2.8230)	(0.0902)	(0.032)	(8.2828)	(0.6176)	(0.074)	(0.2742)	(0.3727)	(0.040)
1975	16.475	1.5355	0.093	4707.8	2503.3	0.531	9801.7	4905.8	0.500
	(2.7978)	(0.0883)	(0.031)	(8.3440)	(0.4679)	(0.056)	(9.0771)	(0.4745)	(0.052)
All	16.835	1.79	0.106	4514.7	2827.3	0.626	12429.0	7232.3	0.582
							(9.3018)	0.54697)	(0.588)
B.C.	15.882	1.2187	0.076	4469.6	2433.4	0.544	8077.9	3021.2	0.374
	(2.7625)	(0.0745)	(0·026)	(8.2843)	(0.5034)	(0.061)	(8.9412)	(0.3326)	(0.037)
E.B.C.	16.000	1.2511	0.078	3829.0	1993.9	0.507	10852.0	5687.1	0.524
	(2.7698)	(0.0757)	(0.027)	(8.1568)	(0.5046)	(0.062)	(9.1719)	(0.4951)	(0.054)
Aided	17.080	2.0184	0.118	4095.0	2101.1	0.513	11822.0	6902.8	0.583
	(2.8314)	(0.1128)	(0.040)	(8.1907)	(0.5176)	(0.063)	(9.2420)	(0.5217)	(0.057)
Unaided	16.980	1.6792	0.099	5027.3	3478.4	0.691	14065.0	7911.0	0.0562
	(2.8273)	(0.0949)	(0.033)	(8.3392)	(0.5850)	(0.070)	(9.4059)	(0.5478)	(0.058)

Note: Figures in parentheses are logs of education, starting and present earnings.

TABLE 4.18

Variance of Education and Earnings

Categories of Graduates	*Education*	*Starting earnings*	*Present earnings*
1	*2*	*3*	*4*
1961	0.1868	0.409	0.285
1965	0.00942	0.253	0.297
1970	0.00801	0.375	0.136
1975	0.00775	0.217	0.223
B.C.	0.0052	0.238	0.104
E.B.C.	0.0055	0.244	0.235
Aided	0.0126	0.265	0.269
Unaided	0.0089	0.339	0.297

TABLE 4.19

Coefficient of Dispersion for Respondents, Respondents' Brothers/Sisters and Parents

Category	*All Graduates and under-graduates*		*All Graduates*		*All Under-graduates*	
	Education	*Present earnings*	*Education*	*Present earnings*	*Education*	*Present earnings*
1	*2*		*3*		*4*	
Respondents	0.375	2.12	0.375	2.12	—	—
Respondents' Brothers/Sisters	0.667	2.83	0.187	2.28	0.636	2.55
Respondents' Parents	1.180	3.50	0.438	4.27	1.33	4.31

Notes and References

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6. M. Blaug, et al., op cit., "The Causes of Graduate Unemployment in India."
7. The average annual rate of growth in enrolment of 10-11 per cent at the higher educational level during 1960s and mid-1970s seems to have slumped to around 4-5 per cent thereafter. How long this trend will continue is anybody's guess.

5

Conclusions

RECENTLY the human capital framework has been developed to analyse the problem of the distribution of earnings and human capital. It is a right move in the sense that over years human capital has grown in importance consequent upon the expansion of education in particular. The expansion of education owes a great deal to the State effort in creating and providing educational facilities at subsidised cost. The subsidy is aimed at not merely the *quantitative-horizontal* expansion of educational facilities but also at the *qualitative-vertical* expansion and distribution of facilities (i.e., equality of educational opportunities socio-economic group-wise, sex-wise and region-wise).

Clouds of uncertainty prevail over the role of human capital in general and education in particular, in correcting income distribution. The proponents of human capital theory feel that the less discriminatory growth of human capital by making other forms of exploitation such as wage, employment etc. less effective, succeeds in alleviating income inequalities. They have realised that the variations in earnings are not only explained by education but also by other variables incorporated in the extended human capital earnings function. Even then, the general view is that around 50 to 60 per cent of the variations in earnings can be said to have been explained by education in terms of years of formal schooling.

The distribution in earnings is explained, on the one hand, by the distribution of schooling and on the other by the magnitude of the rates of return. Normally, the greater inequality of earnings goes with larger dispersion in schooling and higher rates of return. By altering the supply and demand conditions for human capital with the instrument called 'subsidy' (an institutional

factor), the dispersion in schooling (consequently investment) can be reduced and rates of return can be brought down for persons with favourable demand conditions. This ultimately results in the reduced inequality of earnings.

The 'wage competition model' stresses that the continuous expansion of education over time increases the number of persons with more years of schooling and reduces that of those with less schooling. In a perfectly competitive market, this implies the compression of earnings inequality. On the other hand, the 'screening model', not ascribing productive role to education, asserts that it is the labour queue that influences earnings distribution and not education. Thus, whether education (human capital) promotes income equality is a debatable issue. Surprisingly, among the Indian economists a feeling prevails for quite some time now that subsidised education, particularly higher education, is less egalitarian and thus promotes inequality under the prevailing social, political and economic conditions.

It was precisely this widely held view that inspired us to examine in detail this issue of education, earnings and income distribution. There were other equally pressing reasons also for pursuing the present inquiry. Firstly, financing of education (especially subsidised higher education) is blamed for the so-called 'inequality' of education—to which we do not subscribe wholly. Secondly, so far to our knowledge no effort has been made to study the problem in the framework of human capital in the Indian context. Since the commencement of economic planning the Indian economy has witnessed many changes. The foremost among them are : (i) the rapid growth of human capital formed; (ii) changes in the composition of the labour force in terms of educational attainment, age-structure and the employment structure; and (iii) the increase in the share of income from work as against wealth or property.

Quantitative expansion of education has been phenomenal since Independence in India, thanks to the large extent of over-all subsidised education as well as to the structure of subsidy aiming precisely at raising the level of education of the depressed sections of society especially Scheduled Castes and Scheduled Tribes and Economically Backward Class (E.B.C.) population. The ultimate goal is to improve their economic well-being which emanates from the policy of 'preferential treat-

ment' in jobs for the said persons. In the language of international trade theory, protection should be granted to hitherto deprived sections in a stratified society so long as 'unequal competition' among groups of persons exists. The philosophy of 'catching up' —internationally acclaimed—seems to be at the root of the structure of subsidy that has evolved with regard to education and the policy of protection to the disadvantaged section of society.

Whether the structure of subsidy acts as a stratifier or as an equaliser is still a moot question. It needs to be analysed in the light of the above facts regarding the Indian economy.

This study started with the limited object of examining the syndrome of structure of subsidy and the equality of opportunities in the context of the Indian economy. And in its humble way we hope it serves to alter, if not reject, the currently postulated dubious role of subsidy by affirming the positive effect of subsidy.

The issue of the distribution of schooling is tackled in the framework of supply and demand for human capital based on the assumption of 'optimising' behaviour with regard to the demand for education. The over-all subsidy—general and hostel subsidies included—compared with the per capita income does not seem to be egalitarian in the sense that the per capita subsidy is more for families with high per capita income. Perhaps the stratifier effect is much more pronounced than the equaliser effect.

The specific subsidy, again compared with per capita income of the beneficiaries—offered to B.C., E.B.C., and Aided students—does have the equaliser effect in the sense of higher per capita subsidy going to beneficiaries with low per capita income. It reduces the distance between different classes by allowing a greater flow of funds and thus altering the supply conditions of the disadvantaged classes. The narrowing of educational distance among students of different categories is shown by the relative enrolment ratio and relative participation rate which show improvement for B.C., E.B.C. categories in relation to (a) aided and unaided students; (b) total SC/ST population of Baroda district and Gujarat, and (c) non-SC/ST population again of district and state.

The returns and costs have effects on enrolment; their (returns-costs-enrolment) interactions exhibit the optimisation behaviour in relation to education.

In the emerging human capital stock the younger persons

with more education in the place of older persons with less education would have multiplier effect on future distribution pattern and earnings.

Given the set of economic and educational opportunities, the subsidies of specific type have reduced inequalities between generations, attaining thereby the inter-temporal equity in education.

The narrowing of educational distance among various categories of students and between generations and the emerging improved human capital stock are as much social gains as private.

In the light of the stupendous expansion of education—the demand for which is the combined effect of both general and specific subsidies—that general subsidy at any level of education is non-egalitarian looks plausible as the general subsidy is national. But the same cannot be said of specific subsidy received by the people for whom it is meant and which is an antidote.

Extending these conclusions we would suggest that by emphasising the specific subsidies further and by raising the marginal cost to the unaided, the continuation of inqualities—which would be the result of present pattern of general subsidy—can be prevented.

An important thrust of the present study is the use of refined estimates of earnings rather than depending on crude estimates. Equally important is the explanatory character of the human capital variables in the earnings. This has two aspects: the extended human capital earnings function places the human capital variables, especially education, in a clear perspective, namely, that they are a very important determinant of earnings. Similarly, given the inequality of education and inequality of earnings, as in the case of *older* graduates and parents, the human capital variables explain more rigorously the variations of earnings.

An important need in the human capital function is to separate the age from experience to determine overtaking, i.e., when age ceases to be effective and experience becomes significant. In this analysis some effort is made, though they are not separated, the role of experience as distinct from that of age is discernible.

Education does play a role in influencing earnings of both graduates (a homogeneous group : cohorts) and parents and others (a non-homogeneous group). At the 'low' levels of education

(below 10th standard which is the new S.S.C. level) earnings-education association is rather weak ; perhaps there may be a critical minimum of education—even when markets are distorted and self-employed groups dominate earnings pattern when education can be effective. For, in all cases of groups of matriculate and above the role of education as an income determinant is undeniable. Earnings increase with the increase in the amount of schooling.

Our analysis of costs, rates of return and efficiency of investment confirm the predictions of the human capital theory. Rates of growth of earnings are associated with growth rates of education ; the earnings are subject to diminishing marginal returns and the efficiency of the investment in education is increasing.

The combination of variables, age and experience—given others—seems to be preponderating ; yet the 'pure' effect of education in explaining earnings behaviour is clear. The level of education and returns are inversely related.

In conformity with the wage competition model (rather than screening model) diminished inequality of education is associated with diminished inequality of income. For, while subsidy has pushed up educational equality by including the hitherto deprived, education in general has improved equality of incomes.

Between schooling inequality and earnings inequality the former is clearly amenable to fiscal measures while the latter is essentially a long-term problem.

Low mean education, older age and preponderantly self-employed make one constellation leading to greater inequality of incomes. Higher mean education, younger age and declining proportions of self-employed persons make the other constellation leading to less skewed distribution of income and education.

The tendency towards better size distribution of income is woefully show and is not consistent. Even then it should not be intepreted as denying positive role to the financing of education in altering income distribution favourably. It is, on the contrary, heartening to note that unlike a regressive tax system or price inflation, education has not furthered inequalities as claimed by others.

Social rates of return being lower than private rates need not be interpreted as investment in education having reached saturation point. The bridging of educational distance inter-temporally, the creation of efficient human capital stock and better distribution of

income are clear benefits to society. Had education service been priced more competitively, alongwith a higher dose of specific subsidy, the emerging picture in regard to the distribution of schooling and earnings would have been even better. The middle-income group (Aided, in our case, or between bottom 30 per cent and top 30 per cent of population) which appears to be on the verge of vanishing could have performed better.

Appendix

QUESTIONNAIRE

A Research Project Sponsored by the Indian Council of Social Science Research NEW DELHI

AN INQUIRY INTO EQUITY ISSUES INVOLVED IN THE GOVERNMENT FINANCING OF HIGHER EDUCATION IN INDIA
A Study of the M.S. University of Baroda

———

A Survey of the Graduates of the M.S. University—1979

Dear Sir/Madam,

Education, especially university and college education, has recorded phenomenal growth in India since Independence. The burden of financing higher education largely falls on the State. The provision of higher education facilities at an accelerated rate by the State aims at achieving the twin objectives of equality of educational opportunities and that of earnings and income. Education is now viewed as a great equaliser and an instrument of economic and social change.

The present study attempts a scientific and critical analysis with reference to the M.S. University of Baroda of the role of education as an equaliser and a tool for socio-economic change.

Kindly give the information according to the questionnaire. The information gathered through this questionnaire is purely for research work and no information will be published in a manner that will identify individuals who furnish the information. We

value this information and on your co-operation depends the analysis which we are attempting.

Yours truly,

(K.R. SHAH)
Director

P.S.:—Please return the questionnaire to:
Dr. K.R. Shah
Department of Business Economics,
Faculty of Commerce,
Lokmanya Tilak Road,
BARODA-390 002
GUJARAT STATE (INDIA)

QUESTIONNAIRE

Section I

General Information

1.0 Name :————————————————————

1.1 Age:————————————Date of Birth————————

1.2 Sex————————————Male/Female

1.3 Marital Status: Married/Unmarried/Widowed/ Divorced/Others.

1.4 Native (Birth Place):————————————————

1.5 Place of Permanent residence:————————————

————————————————————————

1.7 Length of residence above (1.5). In years————————

1.7 Caste: ———————— Religion————————

Sub-group————————

1.8 Type of family: Nuclear ( ) Joint ( )
(If you are not in a joint family put tick (√) against Nuclear)

1.9 Number of members in your family :————————

Section II

Educational Background

2.0 Educational background of respondent's family.

Sr. No.	*Relation with Respondent*	*Sex*	*Age*	*Educational* status*
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				

*State whether studying or completed. Educational status includes Illiterate, Literate, Primary (I to V classes), Middle (VI to VIII classes). Secondary (IX to XII classes), Intermediate, First degree, Second degree and others.

2.1 Educational Status of respondent

Sr. No.	*Examination passed*	*Year of passing*	*No. of attempts*	*Class/Grade/ Distinction obtained*	*Age at the examination*	*Subjects offered*	
						Major	*Minor*
1.	S.S.C. or H.S.S.C.		1/2/3/4/5	D/I/II/III			
2.	First Degree (B.A., B.Sc. B. Com., B.E., M.B.B.S.)		1/2/3/4/5	D/I/II/III			
3.	Second Degree (M.A., M.Sc., M. Com., M.E., M.D., M.S.)		1/2/3/4/5	D/I/II/III			
4.	Others		1/2/3/4/5	D/I/II/III			

2.2 What kind of elementary/secondary schools did you attend?

(1) Government/Municipal School ( )
(free education)

(2) Private aided school ( )
(tuition paying, government aided)

(3) Private unaided school ( )
(tuition paying, but unaided)

(3) Public school ( )

2.3 What was the medium of instruction at the school level ?

English ( ) Other than English ( )

2.4 Did you stay in a hostel while studying?

(1) University hostel ( )
(2) Governmental hostel ( )
(3) Caste/Community hostel ( )
(4) Diamond Jubilee hostel ( )
Private hostel or rented room ( )

2.5 Why did you go to college/university? Indicate your choice by circling the appropriate number on the scale.

Sr. No.	*Reasons*	*Great importance*	*Importance*	*Very Little Importance*	*Indifferent*	*No Importance*
1	2	3	4	5	6	7
1.	Because my parents were educated.	5	4	3	2	1
2.	Because I got high grade at school	5	4	3	2	1
3.	Because higher education gives status.	5	4	3	2	1
4.	Because I wanted to be an educated man/ woman.	5	4	3	2	1
5.	Because others are studying.	5	4	3	2	1
6.	Because it improves employment opportunites	5	4	3	2	1

1	2	3	4	5	6	7
7.	Because of higher pay for graduates.	5	4	3	2	1
8.	Because financial resources were available for education.	5	4	3	2	1
9.	To join family profession/occupation.	5	4	3	2	1
10.	To get an appropriate bride/bridegroom.	5	4	3	2	1

2.6 Has anybody in your family dropped out before completing elementary/secondary/higher education?

Yes/No

If yes, put tick mark(√)against the reasons given below :

(1) Poor educational record ( )
(2) Poor/indifferent health ( )
(3) Weak financial position ( )
(5) Got a job ( )
(5) Migration ( )

Section III

Financing of Education and Earnings of Respondent's Family

3.0 How many persons of your family were studying with you at the same time in school/college?

No. of persons in school	No. of persons in college
1, 2, 3, 4, 5	1, 2, 3, 4, 5

3.1 Did you and/or your brothers and sisters receive aid for education?

Yes/No

If yes, state the sources of aid given below, mention the amount received and for how many years.

Sr. No.	*Sources of Aid*	*Respondent*		*Brothers/ Sisters*	
		Amount (in Rs.)	*Years*	*Amount (in Rs.)*	*Years*
1.	College/University Freestudentship				
2.	College/University/ Government Merit Scholarship.				
3.	Economically Backward Class (E.B.C.)				
4.	Scheduled Caste/ Scheduled Tribe.				
5.	Central Government Scholarship.				
6.	Private/Public Charity Trusts.				
7.	Employers' Contribution.				
8.	Loan Scholarship from Government, Banks, etc.				
9.	Books/Stationery aid				
10.	Others (Teachers' sons, Political Sufferers, etc.)				

3.2 When you were studying (with others of your family) who were the earning members and what was their earning?

Earning Members	*Total Earnings (in Rs.)*	
	Monthly	*Annual*
(1) Father		
*(2) Others: (a)		
(b)		

*Others include earning members in the family other than father.

3.3 At what age did the earning members mentioned above start earning and what was their earnings/income in their first job/business?

Earning Members	*Age*	*Starting salary (in Rs.)*		*Income (in Rs.) (Self-employed)*	
		per month	*per annum*	*per month*	*per annum*
(1) Father					
(2) Others: (a)					
(b)					

3.4 Where were these employed then? Please tick (√) mark.

Occupation	*Father*	*Others* (a)	*Others* (b)
Agriculture			
Labour			
Service			
Business			
Profession			

3.5 Is any of them still in service or re-employed after retirement or retired? Please (√) mark.

	Father	*Others* (a)	*Others* (b)
Working			
Retired			
Re-employed			

3.6 Income/Earnings/Pensions of the above.

Earning Members	*Income (in Rs. p.m/p.a.)*	*Earnings (in Rs. p.m/p.a.)*	*Pensions (in Rs p.m/p.a)*
Father			
Others: (a)			
(b)			

Section IV

Employment of the Respondent

4.0 Where are you employed and in what capacity ? Please mention your exact designation.

	C1.I	*C1.II*	*C1.III*	*C1.IV**
1. Government (Central/State)				
2. Local Government (Panchayat/Municipal)				
3. Public/Private Industry, Bank etc.				
4. Private service with a lawyer, doctor, engineers, architects, accountants, etc.				

*C1.I = Officers, Managers; C1.II = Officers, Executives ; C1.III = Ministerial and Clerical ; C1.IV = Menial, Peons etc.

4.1 Independent Business/Profession (self-employed)
1. Proprietor/Partner.
2. Lawyer/Doctor.
3. C.A./Solicitor.
4. Architects/Building Contractors.
5. Others.

4.2 How did you get this job?
1. Direct recruitment with application.
2. Employment exchange.
3. With the help of relatives/friends.
4. Reserved for SC/ST/Others.

4.3 When did you get a job after completing education?

Within a month	( )
Within three months	( )
Within six months	( )
Within a year	( )
After more than a year	( )

4.4 At what age did you start earning?

Below 18	( )	Between 18-20	( )
Between 20-25	( )	Between 25-30	( )

4.5 What other jobs did you do before the present job?

(1)
(2)
(3)

(Describe the work you did—Supervisory/Clerical/Managerial or Officer/Others)

4.6 Why did you change the job ?

For improving prospects	( )
For a permanent job	( )
Transfer	( )
Illness	( )
Personal and family problems	( )
Others	( )

4.7 What training courses did you attend ?

On the job	( )
Sponsored by the Company	( )
Conducted by the Company	( )
On my own	( )
Others	( )

4.1 How has this training helped ?

Changed for a better job	( )
Got promotion	( )
Got increments	( )

4.9 Have you ever been out of work on account of long illness ?

Yes_____ No_____

If yes, mention the number of

Weeks_____ Months_____ Years _____

Section V

Earnings of the Respondent

5.0 Please state your emoluments in :

Category	*Basic pay (Rs. p.m.)*	*D.A. (Rs. (p.m.)*	*H.R.A. C.C.A. and Others if any (Rs. p.m.)*	*Bonus (Rs.)*	*Total (Rs. p.m./ p.a.)*
A. Employees :					
The first job					
Next job					
Job immediately before the previous one.					
Present job.					

B. Self-employed

5.1 What is your present pay scale ?

5.2 What were your emoluments ? Rupees (p.m./p.a.)

(1) Before training (after completion of education. _____

(2) After training _____

(3) During training (please √ mark). Full/Half/No

5.3 (1) What was the cost of your training (in Rs.)

(2) How was this covered ? (Please √ mark). Self/Company/Both (i.e., Self and Company)/Others.

5.4 Were you earning while studying ?

(1) Employed fulltime ( )

(2) Employed part-time ( )

(4) Employed throughout the year ( )

(4) Employed during vacations ( )

5.5 What were your earning in 5.4 above ? (Rs. p.m./p.a.)

5.6 Do you get—

(1) Medical benefit for the family ( )

(2) Children's free education ( )

(3) Leave with pay ( )

(4) Holiday at the employer's cost ( )

(5) Allowance for dress/uniform, shoes etc. ( )

(6) Vehicle assistance/allowance. ( )

(7) Meals—free or subsidised ( )
(8) Free tea ( )
(9) Shift allowance ( )
(10) Overtime ( )
(11) Transport—free or subsidised ( )
(12) Entertainment—free or subsidised ( )
(13) Encashment of leave ( )
(14) Payment in lieu of leave under E.S.I. ( )
(15) Travel allowance (leave travel) ( )
(16) Free use of the company's service ( )
(17) Any other type of benefit ( )

5.7 Please indicate your total household income.

Year	*Your total Earnings (Rs. p.m./ p.a.)*	*Total earnings of other household members (Rs. p.m./p.a.)*	*Other Income, Dividends, capital gains, etc.) (Rs. p.m./ p.a.)*	*Total Family Income (Rs. p.m./ p.a.)*
1978/79				
1961 or any relevant year*				

*If you have started earning after 1961, please mention accordingly.

5.8 (1) Designation of your wife/husband, if employed.
(2) Income/earnings of your wife/husband Rs. (P.M./P.A.)

Section VI

6.0 Which of the following were possessed by your family and bought by you when you began earning ?

Sr. No.	*Item*	*Possessed by your family*	*Bought by you*	*Value (in Rs.)* *Family*	*Your own*
1.	Land				
2.	House				
3.	Radio				
4.	Stereo				
5.	Tape recorder				

6. Air-coolers
7. Fans, furniture
8. Refrigerator
9. Telephone
10. Cars/Scooters/Cycles
11. T.V. set
12. Sewing/Washing machines
13. LIC policy
14. Postal Saving Certificates/ Bank Deposits
15. Any other assets (Shares, Securities, Bonds, etc.)

We express our thanks for your co-operation in filling out this questionnaire.

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